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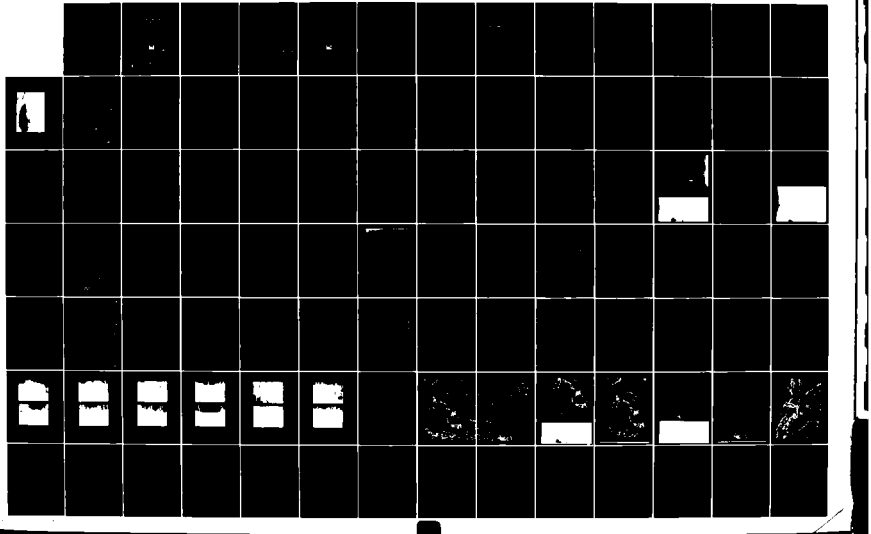

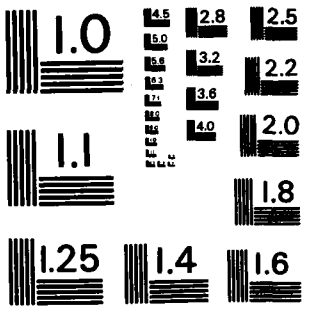

THAMES RIVER BASIN
PLAINFIELD, CONNECTICUT

PACKERS POND DAM
CT 00578

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

84 08 20 034

DECEMBER 1980

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,
Thames River Basin
Plainfield, Connecticut

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Packers Pond Dam is an earth embankment impounding 450 acre-feet of water on Mill Brook. The length of the dam, including the spillway, is 325 feet. The dam is classified as a significant hazard, small size dam. The test flood range is from the 100 year flood to ½ the PMF. Based upon the visual inspection at the site and past performance, the dam is judged to be in fair condition.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

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REPLY TO
ATTENTION OF:

JUL 09 1981

NEDED

Honorable William A. O'Neill
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor O'Neill:

Inclosed is a copy of the Packers Pond Dam (CT-00578) Phase I Inspection Report, prepared under the National Program for Inspection of Non-Federal Dams. This report is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. I approve the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is vitally important.

Copies of this report have been forwarded to the Department of Environmental Protection. Copies will be available to the public in thirty days.

I wish to thank you and the Department of Environmental Protection for your cooperation in this program.

Sincerely,

C. E. EDGAR, III
Colonel, Corps of Engineers
Commander and Division Engineer

Incl
As stated

A-1

THAMES RIVER BASIN

PLAINFIELD, CONNECTICUT

PACKERS POND DAM

CT 00578

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY

NEW ENGLAND DIVISION, CORPS OF ENGINEERS

WALTHAM, MASS. 02154

DECEMBER 1980

BRIEF ASSESSMENT

PHASE I INSPECTION REPORT

NATIONAL PROGRAM OF INSPECTION OF DAMS

Name of Dam:	PACKERS POND DAM
Inventory Number:	CT 00578
State Located;	CONNECTICUT
County Located:	WINDHAM
Town Located:	PLAINFIELD
Stream:	MILL BROOK
Owner:	ROBERT GLUCK
Date of Inspection:	NOVEMBER 13, 1980
Inspection Team:	PETER M. HEYNEN, P.E.
	JAY A. COSTELLO
	MURALI ATLURU, P.E.

The Packers Pond Dam, built about 1880 to provide water for industrial use, is an earth embankment impounding 450 acre-feet of water on Mill Brook. The length of the dam, including the spillway, is 325 feet. The top of the dam averages between 12-15 feet in width and is approximately 18 feet above the old streambed at the spillway discharge channel. The spillway, located at the right end of the dam, is a 64 foot long, broad-crested, stone masonry structure which provides 4.4 feet of freeboard from the crest to the top of the dam. The outlet is a concrete intake and gate structure located on the upstream slope at the left end of the dam. The gate is not functional and the size of the outlet could not be exactly determined. However, the outlet is assumed to be approximately 3 feet wide by 2.5 feet high.

A railroad embankment runs along the downstream toe of the dam. This embankment is about 24 feet in height, with the top of the embankment approximately 12 feet higher than the top of the dam.

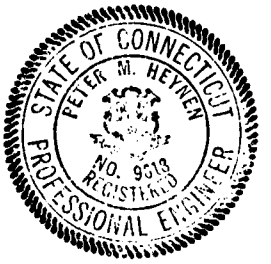
In accordance with the Army Corps of Engineers Guidelines, Packers Pond Dam is classified as a significant hazard, small size dam. The test flood range is from the 100 year flood to one-half the Probable Maximum Flood (1/2 PMF). The test flood for Packers Pond Dam is selected as equivalent to the 100 year flood. Peak inflow to the pond at the test flood is 6800 cubic feet per second (cfs) and peak outflow is 5970 cfs with the dam overtopped by 2± feet. The spillway capacity with the pond level at the top of the dam is 1700 cfs, which is 28% of the routed test flood outflow.

Based upon the visual inspection at the site and past performance, the dam is judged to be in fair condition. There are items which require repair, maintenance and monitoring. These include the deteriorating masonry wall along the downstream slope, the poor condition of the stone outlet channel between the dam and railroad embankments, debris blocking the outlet, seepage through the spillway structure, removal of trees and brush from the slopes and regrading of the upstream slope and the top of the dam.

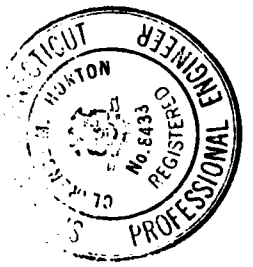
It is recommended that the owner retain a registered professional engineer qualified in dam design and inspection to perform services as presented in Section 7.2. Corrective measures presented in Section 7.2 include a detailed analysis to more accurately determine the adequacy of the project discharge capacity and the project overtopping potential. Also, the engineer should make recommendations for installation of a low-level outlet, repair of the existing outlet, and elimination of seepage at the spillway structure. Other corrective measures which should be addressed by the engineer are repairing the masonry wall along the downstream slope, repairing the outlet channel between the dam and railroad embankment, removing large trees from the embankment, regrading the slopes and placing riprap on the upstream slope.

The above recommended corrective measures and further remedial measures presented in Section 7, should be instituted within 1 (one) year of the owner's reciept of this report.

Peter M. Heynen, P.E.
Chief Geotechnical Engineer
Cahn Engineers, Inc.



C. Michael Horton, P.E.
Chief Engineer
Cahn Engineers, Inc.



This Phase I Inspection Report on PACKERS POND DAM (CT-00578) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.

ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

JOSEPH W. FINEGAN, JR., CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspection. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam would necessarily represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions will be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions there of. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as neccessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

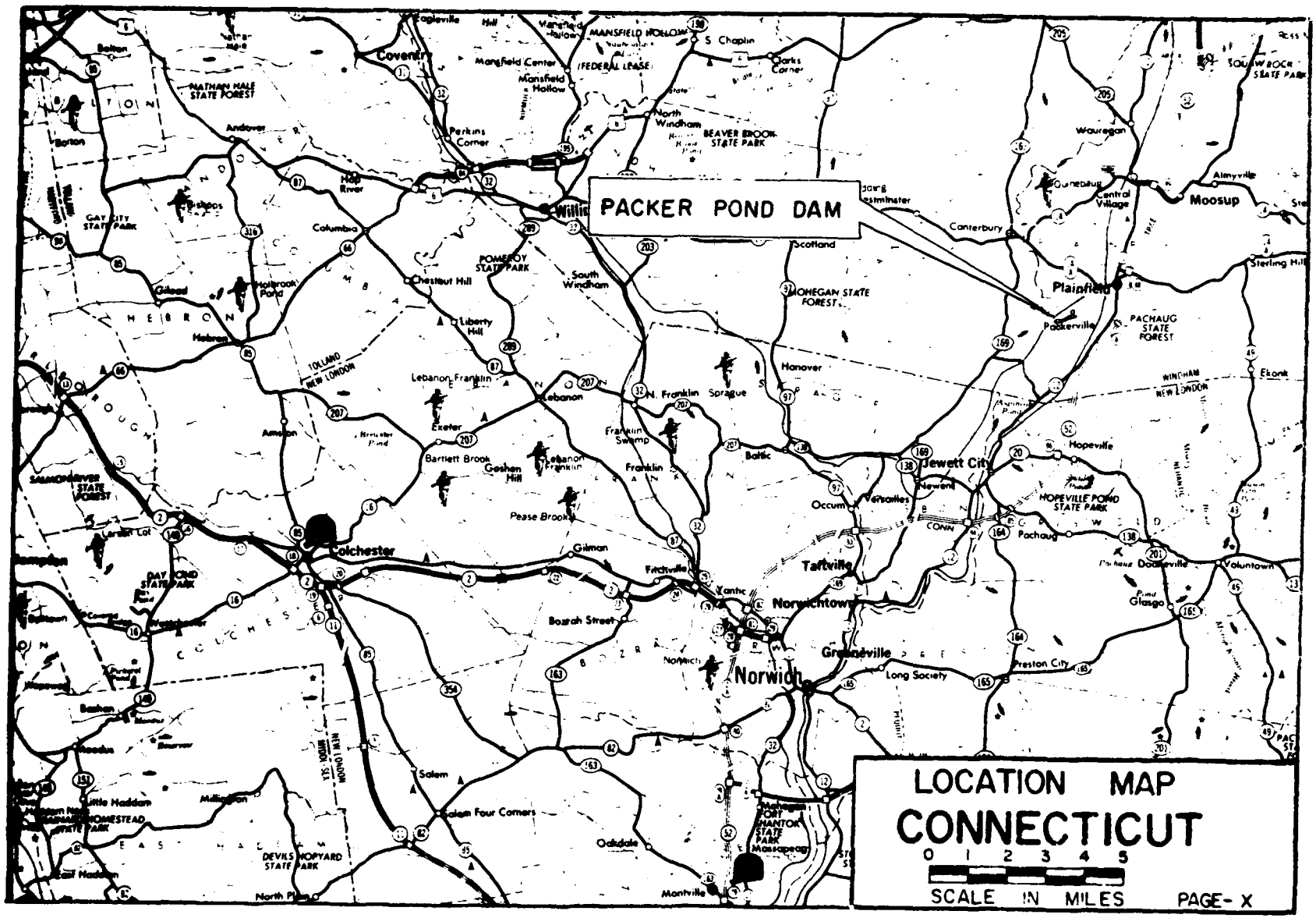
The information contained in this report is based on the limited investigation described above and is not warranted to indicate the actual condition of the dam. The integrity of the dam can only be determined by a means of a monitoring program and/or a detailed physical investigation. The accuracy of available data is assumed where not in obvious conflict with facts observable during the visual inspection.

TABLE OF CONTENTS

APPENDICES

OVERVIEW PHOTO
(February 1980)

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Packers Pond Dam	Plainfield	DATE Dec. 1980
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED DAMS	Mill Brook	CONNECTICUT	CE # 27785KF PAGE ix


PACKER POND DAM
LOCATION MAP
CONNECTICUT
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SCALE IN MILES
PAGE- X

PHASE I INSPECTION REPORT

PACKERS POND DAM

SECTION I - PROJECT INFORMATION

1.1 GENERAL

a. Authority - Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Cahn Engineers, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Cahn Engineers, Inc. under a letter of April 14, 1980 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW 33-80-C-0052 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection Program - The purposes of the program are to:

1. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interests.

2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dam.

3. To update, verify and complete the National Inventory of Dams.

c. Scope of Inspection Program - The scope of this Phase I inspection report includes:

1. Gathering, reviewing and presenting all available data as can be obtained from the owners, previous owners, the state and other associated parties.

2. A field inspection of the facility detailing the visual condition of the dam, embankments and appurtenant structures.

3. Computations concerning the hydraulics and hydrology of the facility and its relationship to the calculated flood through the existing spillway.

4. An assessment of the condition of the facility and corrective measures required.

It should be noted that this report passes judgment only on those factors of safety and stability which can be determined by a visual surface examination. The inspection is to identify those visually apparent features of the dam which evidence the need for corrective action and/or further study and investigation.

1.2 DESCRIPTION OF PROJECT

a. Location - The dam is located on Mill Brook (Thames River Basin) in a rural area of the town of Plainfield, County of Windham, State of Connecticut. The dam is shown on the Plainfield U.S.G.S. Quadrangle Map, having coordinates latitude 41°39.9' and longitude W71°56.9'.

b. Description - The dam is a 325 foot long earth embankment with a masonry spillway and a mid-level outlet. There is a railroad embankment which runs approximately parallel to the dam and abuts the downstream slope of the dam (See Sheet B-1). This railroad embankmert has a top elevation of 158.0 (12± feet higher than the top of the dam), is approximately 24 feet in height, and has a brick arch culvert to carry dam outlet discharge and a trestle spanning the spillway discharge channel (Photo 12).

The top of the dam is 4.4 feet above the spillway and varies in width, averaging between 12 to 15 feet. The elevation for the top of the dam (elevation 146.4) was taken at the lowest point, which is just to the left of the spillway. The height of the dam is measured as the distance from this point to the base of the spillway, which is 17.7 feet. The top of the dam has a foot path along its length and is covered with weeds and small trees. The upstream slope is very irregular, slopes at about 1.5 horizontal to 1 vertical above the waterline and about 3 horizontal to 1 vertical below the water. A small stone wall measuring 3 feet high by 10 feet long is located on the upstream slope at both sides of the outlet structure. The downstream slope is inclined at 1.5 horizontal to 1 vertical and has a dry-laid stone masonry wall which used to extend along the toe 70± feet from the spillway, but which is now broken up so that it extends only about 35 feet (See Sheet B-1 and Photo 6). Both the upstream and downstream slopes are covered with small trees, brush and stumps.

The spillway is a 64 foot long, broad-crested stone masonry structure which appears to be founded on bedrock and measures about 13.3 feet in height. The downstream face is stepped, with each course about 16 inches high. The top 1.3 feet is concrete and forms the spillway crest, with a maximum elevation of 142.0. There are 4± foot high stone masonry training walls at each end of the spillway and a stone wall extending along the left side of the spillway discharge channel (See Sheet B-1, Photos 7, 8, 12). The spillway discharge channel is about 6 feet deep and has a floor of bedrock. The opening under the railroad trestle is approximately 25 feet wide at the channel floor and 25 feet high.

A concrete intake and gate structure, which is located at the upstream side of the top of the dam (See Photos 1, 3, 9), forms the mid-level outlet. The type of gate is unknown, the gate mechanism is inoperable and the intake is partially filled with silt and debris. The exact dimensions of the outlet are unknown, however field observations indicate the opening is approximately 3 feet wide by 2.5 feet high. The invert at the intake side of the

gate structure is 138.2 and the invert at the outlet side of the gate structure is 136.5. An open, stone lined channel approximately 3 feet wide, 10 feet deep and 20 feet long, extends between the gate structure and the railroad embankment (See Sheet B-1). Discharge from the dam outlet is carried through this channel to a 6 foot high by 5 foot wide brick arch culvert through the railroad embankment. The outlet at the toe of the railroad embankment is a concrete headwall opening to a small canal running parallel to Lillibridge Road.

c. Size Classification - SMALL - The dam impounds 450 acre-feet of water with the pond level at the top of the dam, which at elevation 146.4, is 17.7 feet above the spillway discharge channel. According to the Recommended Guidelines, a dam with this height and storage capacity is classified as small in size.

d. Hazard Classification - (SIGNIFICANT) - If the dam were breached, there would be a potential for the loss of a few lives and some property damage at two houses located 1000 and 1300 feet downstream along Packer Road (See Sheet D-1). The rapid 4.4 foot rise in the water level at this primary impact area upon failure of the dam would result in ground floor flooding of these two homes by more than 1 foot. Due to the rapid rise in water level and the expected velocity, the resulting property damage and possibility for loss of life classifies Packers Pond Dam as a significant hazard.

e. Ownership - Mr. Robert Gluck
RFD #1
Plainfield, CT 06374
(203)-564-2324

f. Operator - Owner (See Ownership, above)

g. Purpose - The dam was originally built to impound water for industrial use at a mill several hundred feet downstream and which no longer exists. There is no present use for the pond.

h. Design and Construction History - According to available data, the dam was built in 1880. The original owner, Mr. Packer, also built the dam. When Mr. Packer died, his nephew, Mr. William Bramwell, inherited the property which he sold to the present owner in the early 1950's. At some time during the life of the dam, a concrete gate structure was installed and a concrete cap was placed on the spillway crest. According to earlier inspection reports, there may have been a short piece of 48 inch pipe extending through part of the dam embankment (See Appendix B, pages B-5, B-7) at the outlet. If this did exist, it has been removed and the open channel extended upstream to the intake/gate structure. There are no records available for these repairs or alterations, and the present owner reports he has not made any changes at the dam.

i. Normal Operational Procedures - There are no formal operational procedures followed at the dam. The outlet gate is inoperable and flow is controlled by the water level and the amount of debris in front of the intake.

1.3 PERTINENT DATA

a. Drainage Area - The drainage area is 17.9 square miles of rolling terrain which is located in the Thames River Basin.

b. Discharge at Damsite - Normal discharge is over the spillway and through the mid-level outlet. Elevations listed below are approximate N.G.V.D., based on an assumed datum as shown on Sheet B-1.

1. Outlet Works (conduits):	
mid-level intake @ upstream invert elevation 138.2:	160 cfs (Pond level at top of dam)
2. Maximum flood at damsite:	Unknown
3. Ungated spillway capacity @ top of dam el. 146.4:	1700 cfs
4. Ungated spillway capacity @ test flood el. 148.4:	2970 cfs
5. Gated spillway capacity @ normal pool el. 142.0:	N/A
6. Gated spillway capacity @ test flood el. 148.4:	N/A
7. Total spillway capacity @ test flood el. 148.4:	2970 cfs
8. Total project discharge @ top of dam el. 146.4:	1860 cfs
9. Total project discharge @ test flood el. 148.4:	5970 cfs

c. Elevations (All elevations are approximate N.G.V.D. based on an assumed datum: Spillway crest = elevation 142.0)

1. Streambed @ base of spillway:	128.7
2. Bottom of cutoff:	N/A
3. Maximum tailwater:	Unknown
4. Normal pool:	142.0
5. Full flood control pool:	N/A
6. Spillway crest:	142.0

7. Design surcharge (original design):	Unknown
8. Top of dam:	146.4
9. Test flood surcharge:	148.4
d. Reservoir (Length in feet)	
1. Normal pool:	4000 ft.
2. Flood Control pool:	N/A
3. Spillway crest pool:	4000 ft.
4. Top of dam pool:	4800 ft.
5. Test flood pool:	6000 ft.
e. Storage (Acre-feet)	
1. Normal pool:	95 acre-ft.
2. Flood control pool:	N/A
3. Spillway crest pool:	95 acre-ft.
4. Top of dam pool:	450 acre-ft.
5. Test flood pool:	745 acre-ft.
f. Reservoir Surface (Acres)	
1. Normal pool:	21 acres
2. Flood control pool:	N/A
3. Spillway crest pool:	21 acres
4. Top of dam pool:	140 acres
5. Test flood pool:	195 acres
g. Dam	
1. Type:	Earth embankment
2. Length:	325 ft. (Total)
3. Height:	17.7 ft.
4. Top width:	12-15 ft.
5. Side slopes:	1.5H to 1V (Upstream - above waterline 3H to 1V (Upstream - below waterline) 1.5H to 1V (Downstream)

6. Zoning:	N/A
7. Impervious Core:	Unknown
8. Cutoff:	N/A
9. Grout curtain:	N/A
10. Other:	35 ft. long, 8-10 ft. high dry-laid stone masonry wall at right end downstream slope.

h. Diversion and Regulating Tunnel - N/A

i. Spillway

1. Type:	Ungated broad-crested stone masonry weir
2. Length of weir:	64 feet
3. Crest elevation:	142.0
4. Gates:	N/A
5. Upstream Channel:	Sand and gravel fill
6. Downstream Channel:	25' wide channel with rock floor and 6± foot high stone wall along left side.
7. General:	Opening for railroad embankment is 25 feet high by 25 feet wide at the base.

j. Regulating Outlet

1. Invert:	138.2 (Upstream)
2. Size:	3'x2.5' (Assumed)
3. Description:	Unknown
4. Control Mechanism:	In-operable gear type hoist.
5. Other:	Stone lined channel is 3' wide by 10 feet deep by 20 feet long. It extends from intake to 6' arch conduit under railroad embankment.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

There is no data available for the original design or subsequent repairs to the dam.

2.2 CONSTRUCTION

There is no data available for construction of the dam or for subsequent repairs.

2.3 OPERATION

The only available information on operation procedures at the dam is available from the State of Connecticut, Department of Environmental Protection. This data includes a State inventory data sheet and a series of inspection reports with recommendations for repair between 1965 and 1978. There are no lake level readings taken at the dam and the outlet is ungated with flow being regulated by the level of the pond and the amount of debris in front of the intake. No formal operation records are in existence.

2.4 EVALUATION

a. Availability - Existing data was provided by the State of Connecticut and the owner made the project available for visual inspection.

b. Adequacy - The limited amount of engineering data available is inadequate to perform an in-depth assessment of the dam, therefore, the assessment of this dam must be based on visual inspection, hydraulic computations, hydrologic judgements and information provided verbally by the owner.

c. Validity - A comparison of previous inspection reports and visual observations reveals some discrepancies in the configuration of the outlet. According to earlier reports, there may have been a short length of 48 inch pipe extending from the gate structure toward the railroad embankment. If this pipe existed, it has been removed and replaced with open channel.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General - Based on the visual inspection performed November 13, 1980, the condition of the dam is judged to be fair. The inspection revealed items requiring various levels of repair, maintenance and monitoring. The lake level at the time of the inspection was just below the spillway crest (elevation 142.0) with no water flowing over the spillway.

b. Dam

Top of Dam - A footpath extends the entire length of the embankment. The width at the top varies and the elevation at the top rises slightly from 146.4 at either end to 147 at the center. There are small trees (4 inches diameter) growing along the length of the dam (Photos 3, 4, 5).

Upstream Slope - The upstream slope is quite irregular with small trees and brush growing from the embankment (Photo 1). Erosion of the slope is occuring due to the lack of riprap protection at the waterline, the lack of protective growth on the slope and trespassing. A large area of erosion measuring about 8 feet wide, 12-15 feet long and 2 feet deep is located 65 feet from the left end of the dam (Photo 2). A small dry-laid stone masonry wall extends from each side of the gate structure at the left end of the dam. These walls are about 10 feet long, 3 feet high and in need of minor repair.

Downstream Slope - The downstream slope has no protective cover, other than trees and brush. A dry-laid stone masonry wall extends for 35± feet from the spillway along the downstream slope. At one time, the wall extended for another 35 to 40 feet, but this section has failed (Photos 5 and 6). The remaining portion of the wall appears to be in good condition. The railroad embankment which runs approximately parallel to the dam, abuts the downstream slope of the dam, forming a gulley between the two embankments (See Photos 3, 5 and Overview Photo). Much of the downstream slope is covered by the railroad embankment, but no seepage was observed on the visable portions of the slope.

Spillway - The stepped downstream face of the spillway is quite irregular with some stones displaced at the lower courses (Photo 8). Voids, approximately 2 feet in depth, were noted between the courses of stone about 4 feet below the spillway crest. The upper two courses of stone appear to have been replaced or repointed and a concrete cap placed along the crest. Steel rods for flashboards, protruding from this concrete cap, have been broken off or bent down. Some loose, silty, sand and gravel fill has been recently placed along the upstream side of the spillway (Photo 7). Seepage, located somewhere along the left downstream end of the spillway at the lower courses of stone (under the tailwater), can be heard but could not be measured or located. Also, some clear

seepage of less than 1 gpm was noted at the base of the spillway near the right spillway wall (See Sheet B-1). Some reddish-brown staining was observed in the area around this seep. Although the spillway had no flow over the crest, a flow of 10-15 gpm was noted in the spillway discharge channel. The stone masonry walls at either end of the spillway and along the left side of the spillway discharge channel appear to be in fair condition. The stone work is in good condition, however there is some undermining at the base of the right wall about 15 feet downstream from the base of the spillway and visible at the far left side of Photo 7. The spillway discharge channel is free of debris except for a tree at the right side of the channel.

Other - Seepage was observed at the left downstream side of the railroad embankment, forming a wet soggy area along the toe of this embankment to the spillway discharge channel. This seepage is clear and appears to be flowing from the brick arch culvert or through the dike at the right side of the outlet channel, and does not appear to be related to the dam (See Overview Photo).

c. Appurtenant Structures - The concrete at the intake/gate structure is in fair condition. The stone lined channel between the gate and the railroad embankment is deteriorating and has some vegetation growing between the stones (Photos 9 and 10). Some wood supports have been placed across this channel, but these also are starting to deteriorate. The gate mechanism is rusted, inoperable and does not appear to be connected to any kind of gate. The intake at the upstream side of the gate structure is silted in and clogged with wood and debris. Flow through the outlet is controlled by the level of the pond and the amount of debris in front of the intake.

The brick arch culvert under the railroad embankment could not be observed, however the upstream end is visible in Photo 10. The new concrete headwall at the outlet to the arch culvert is in good condition.

d. Reservoir Area - The area surrounding the pond is fairly steep and wooded except for the swampy area at the east end of the lake. There is no development at the pond.

e. Downstream Channel - The downstream channel of the spillway discharge channel follows the natural bed of Mill Brook. It is crossed by a railroad trestle just below the dam and a bridge at Packer Road. The channel for the dam outlet is a small canal with a 5+ foot high dike extending along the right side. It is fairly clear to the junction with Mill Brook.

3.2 EVALUATION

Based upon the visual inspection, this dam is assessed as being in fair condition. The following features which could influence the future condition and/or stability of the dam were identified.

1. Seepage through the masonry spillway could cause failure of this structure if allowed to continue unchecked. Some holes at the upstream side of the spillway, presumably caused by this seepage and mentioned in previous inspection reports in Appendix B, could not be observed as the owner recently placed loose fill in this area (Photo 7).

2. Erosion and undermining at the base of the stone masonry wall at the right side of the spillway discharge channel may cause this wall to collapse if it is not repaired.

3. The lack of protective growth on the embankment and erosion and lack of riprap on the upstream slope will increase the potential for severe erosion, and possible failure of the embankment, should the dam be overtopped.

4. The growth of trees and brush, if left unchecked, could result in root penetration and weakening of the dam by uprooting or providing seepage paths through the embankment.

5. The debris at the intake, if not cleaned out periodically, will continue to accumulate, reducing the outlet capacity.

6. The open channel between the gate/intake structure and the railroad embankment could collapse and reduce the outlet capacity. If the channel were to collapse and sufficiently reduce the capacity of the arch culvert under the railroad embankment discharge would flow along the gulley at the toe of the dam, causing erosion of the embankment.

SECTION 4: OPERATION PROCEDURES

4.1 REGULATING PROCEDURES

a. General - No formal operation procedure exists.

b. Description Of Any Formal Warning System in Effect -No formal warning system is in effect.

4.2 MAINTENANCE PROCEDURES

a. General - There is no formal maintenance procedures at the dam.

b. Operating Facilities - No formal program for maintenance of the operating facilities is in effect.

4.3 EVALUATION

A formal program of operation and maintenance procedures should be implemented, including documentation of lake levels for future reference. Also, a formal warning system should be developed within the time frame indicated in Section 7.1(c). Remedial operation and maintenance recommendations are presented in Section 7.

SECTION 5: EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 GENERAL

The Watershed is 17.9 square miles of rolling wooded terrain with some swampy areas scattered throughout the watershed. The maximum impoundment to the top of the dam (El. 146.4) is estimated to be 450 acre-feet and estimated storage below spillway crest is 95 acre-feet. The dam is classified as being small in size and having a significant hazard classification.

5.2 DESIGN DATA

No hydrulic or hydrologic design data are available for this dam.

5.3 EXPERIENCE DATA

No information on any serious problem situations arising at the dam was found. However, in a letter from the Town of Plainfield to the State of Connecticut in 1972, some damage to two roads in the downstream reaches was noted. The maximum previous discharge at this dam is unknown.

5.4 TEST FLOOD ANALYSIS

Based upon the Army Corps of Engineers "Preliminary Guidance for Estimating Maximum Probable Discharges," date March 1978, the watershed classification (rolling), and the drainage area of 17.9 square miles; a PMF of 26,000 cfs or 1450 cfs per square mile is estimated at the dam site. The dam is classified as a significant hazard, small size dam, and therefore the test flood is in the 100 year to ½ PMF range. The test flood for Packer Pond Dam is selected as equivalent to the 100 year flood. The peak inflow at the test flood is estimated to be 6800 cfs and the peak outflow is 5970 cfs with a maximum stage in the pond of 148.4, or 2± feet above the top of the dam. The spillway capacity with the pond level at the top of the dam is 1700 cfs, which is 28% of the routed test flood outflow.

5.5 DAM FAILURE ANALYSIS

Two houses, located on Packer Road approximately 1000 and 1300 feet downstream from the dam, have basement floors 9± feet above the streambed of Mill Brook. This area is designated as the primary impact area and is shown as such on Sheet D-2. In addition to this primary impact area, damage is expected to occur (upon breach of the dam) at the culvert under Packerville Road about 400 feet downstream from the dam.

Utilizing the Corps of Engineers April 1978 "Rule of Thumb Guidance for Estimating Downstream Failure Hydrographs", the peak failure outflow due to dam breach is estimated to be 8500 cfs with an estimated flood depth of 8 feet immediately downstream of the dam. The flood routing was performed for peak failure outflow with pool at top of dam. The railroad trestle opening below the spillway has adequate capacity to pass the dam failure outflow. The prefailure flow in the stream is estimated to be 1860 cfs causing a depth of 5.5 feet in the stream bed at the primary impact area. After failure, the flood stage is estimated to increase by 4.4 feet, resulting in a total depth of approximately 10 feet at the initial impact area.

With the flood depth at 10± feet, the two homes at the primary impact area would be flooded by 1± feet of water. The velocity of the flood water in the vicinity of these houses is expected to reach 9.5 fps. Also, a constriction formed by a concrete wall in the stream just below the primary impact area could increase the flood depth at the primary impact area.

Based on the hydraulic/hydrologic analysis and the potential for loss of a few lives, the dam has a significant hazard classification.

SECTION 6: EVALUATION OF STRUCTURAL STABILITY

6.1 VISUAL INSPECTION

The dam is an earth embankment with a 64 foot long spillway at the right end and a mid-level outlet at the left end. The low point of the top of the dam is at elevation 146.4, the spillway crest at elevation 142.0 and the upstream invert of the outlet is elevation 138.2. The embankment is 17.7 feet above the spillway discharge channel and 15± feet wide at the top. The downstream slope is inclined at 1.5± horizontal to 1 vertical and the upstream slope is inclined at 3± horizontal to 1 vertical below the waterline and 1.5 horizontal to 1 vertical above the waterline. The existence of an impervious core is unknown, however there is a dry-laid stone masonry retaining wall extending for 35 feet from the spillway along the downstream slope. No evidence of toe drains, piezometers or other seepage control or monitoring devices were found at the dam.

The inspection revealed some items needing repair at the dam. Seepage was noted at the spillway. Not all of the seepage could be located, but the visable seepage did appear to be clear and free of sediment (See Section 3). The fill placed on the upstream side of the spillway, probably to eliminate seepage or its affects, will not be sufficient to prevent this seepage. Also, some voids were noted between the stone blocks at the downstream side of the spillway about 4 feet below the crest. It appears that the stone retaining wall along the downstream slope did, at one time, extend for another 35-40 feet, but this portion has failed (Photos 5 and 6), reducing the slope angle and the width of the top of the dam in this area. Because the railroad embankment abuts the downstream slope at about 8 feet below the top of the dam and gives the slope added support, the failure of this portion of the wall does not appear to be a major structural problem. No method for controlling flow exists at the outlet other than the constriction by the debris at the intake. The open, stone-lined channel between the intake and the brick arch culvert under the railroad embankment needs repair. It is now supported by wood shoring, but should it fail and constrict the brick arch culvert, discharge would flow toward the spillway along the toe of the dam in the gulley between the two embankments. Recommendations are presented in Section 7 for the above mentioned items, as well as others described in Section 3.

6.2 DESIGN AND CONSTRUCTION DATA

No information is available for the design or construction of the dam.

6.3 POST CONSTRUCTION CHANGES

The concrete intake/gate structure at the left end of the dam and the concrete cap on the spillway crest appear to have been added after the original construction. Also, a short length of 48 inch pipe at the outlet (reported to exist in previous inspection reports, See Appendix B Pages B-5, B-7), appears to have been removed and the open channel extended to the intake structure. When these changes were made and who designed or constructed them is unknown.

6.4 SEISMIC STABILITY

The dam is in Seismic Zone 1 and according to the Recommended Guidelines, need not be evaluated for seismic stability.

SECTION 7: ASSESSMENT, RECOMMENDATIONS, AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Condition - Based upon the visual inspection of the site and past performance, the dam is judged to be in fair condition. There are items requiring repair and maintenance; these include repair to the stone masonry structures, removal of trees and brush and seepage control at the spillway.

Based upon the "Preliminary Guidance for Estimating Maximum Probable Discharge" dated March, 1978 and hydraulic/hydrologic computations, peak inflow to the lake is 6800 cfs; peak outflow is 5970 cfs with the dam overtopped by 2 feet. The spillway capacity with the pond to the top of the dam (el. 146.4) is 1700 cfs; which is equivalent to 28% of the routed test flood outflow.

b. Adequacy of Information - The information is such that an assessment of the condition and stability of the dam must be based solely on visual inspection, history of the dam, and sound engineering judgement.

c. Urgency - It is recommended that the measures presented in Section 7.2 and 7.3 be implemented within 1 year of the owner's receipt of this report.

7.2 RECOMMENDATIONS

It is recommended that the owner retain the services of a registered professional engineer qualified in dam design and inspection to perform further investigation pertaining to the following items. Recommendations for corrective measures should be made by the engineer and implemented by the owner.

1. A detailed hydraulic/hydrologic analysis to more accurately determine the adequacy of the project discharge and the overtopping potential. This should include the affect of the present intake elevation on drawdown capabilities of the project and providing some means of completely lowering the lake.

2. The gate at the existing mid-level outlet should be repaired or completely removed so as not to restrict flow. All silt and debris should be removed from the intake.

3. The stone-lined open channel between the intake/gate structure and the railroad embankment should be repaired or the side walls permanently supported.

4. The seepage at the spillway structure should be located and evaluated to determine its affect on the stability of the project. The affect of the fill recently placed on the upstream side of the spillway should also be investigated.

5. The left end of the remaining portion of the stone masonry wall at the right end of the downstream slope, should be repaired so as to discontinue any further deterioration of the remaining wall.

6. Large trees and stumps should be removed from the embankment. This should include removal of root systems, proper backfilling, regrading the slopes and top of dam, and re-establishment of protective growth.

7. Riprap protection should be placed on the upstream slope between expected high and low water elevations.

8. Erosion and undermining at the base of the stone masonry wall at the right side of the spillway discharge channel should be repaired and protected against further erosion.

7.3 REMEDIAL MEASURES

a. Operation and Maintenance Procedures - The following measures should be undertaken within time period indicated in Section 7.1c, and continued on a regular basis.

1. A formal program of operation and maintenance procedures should be instituted and fully documented to provide accurate records for future reference. A program for monthly inspection by the owner or owner representative should be developed and include proper documentation.

2. A comprehensive program of inspection by a registered professional engineer qualified in dam design and inspection should be instituted on an annual basis.

3. The owner should develop and implement a downstream warning system in case of emergency at the dam. A program should be established for monitoring of the project during periods of intense rainfall.

4. Small trees and brush should be removed from the embankment and spillway discharge channel.

5. Removal of debris from the mid-level outlet should be continued on a regular basis.

7.4 ALTERNATIVES

This study has identified no practical alternatives to the above recommendations.

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Packers Pond Dam DATE: November 13, 1980

TIME: 9:30 - 1:00 PM

WEATHER: Cloudy, 45°F

W.S. ELEV. 142.0 U.S. _____ DN.S

PARTY:	INITIALS:	DISCIPLINE:
1. Peter M. Heynen	PMH	Cahn - Geotech.
2. Jay A. Castello	JAC	Cahn - Geotech.
3. Murali Atluru	MA	DTC - H/H
4. Frank Segaline	FS	Cahn - Survey
5.		
6.		

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Embankment	PMH, JAC, MA, FS	A-2
2.	Spillway	PMH, JAC, MA, FS	A-3
3.	Intake/Gate Structure	PMH, JAC, MA, FS	A-4
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

PERIODIC INSPECTION CHECK LIST

PROJECT Packers Pond Dam DATE November 13, 1980

PROJECT FEATURE Embankment BY PMH, JAC, MA, FS

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	146.4
Current Pool Elevation	142.0
Maximum Impoundment to Date	Unknown
Surface Cracks	None observed
Pavement Condition	N/A
Movement or Settlement of Crest	None observed
Lateral Movement	
Vertical Alignment	Appears good
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	
Indications of Movement of Structural Items on Slopes	None observed
Trespassing on Slopes	yes - u/s slope & top of dam
Sloughing or Erosion of Slopes or Abutments	yes - erosion @ u/s slope, sloughing of d/s slope at failed stone wall
Rock Slope Protection-Riprap Failures	u/s slope needs riprap
Unusual Movement or Cracking at or Near Toes	None observed
Unusual Embankment or Downstream Seepage	
Piping or Boils	
Foundation Drainage Features	None observed
Toe Drains	
Instrumentation System	

PERIODIC INSPECTION CHECK LIST

PROJECT Packers Pond Dam DATE November 13, 1980

PROJECT FEATURE Spillway BY PMH, JAC, MA, ES

AREA EVALUATED	CONDITION
OUTLET WORKS-SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	Stone masonry weir w/stone training walls @ each side of discharge Channel
a) **Approach Channel**	
General Condition	Good - fill recently placed u/s side of weir
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	
Floor of Approach Channel	Steep - loose sand & gravel fill
b) **Weir and Training Walls**	
General Condition of Concrete	Fair - lower coorses of stone masonry need repair
Rust or Staining	N/A
Spalling	
Any Visible Reinforcing	
Any Seepage or Efflorescence	Seepage emanating from lower left d/s side of weir
Drain Holes	N/A
c) **Discharge Channel**	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Some
Floor of Channel	Bedrock, good condition
Other Obstructions	Opening under trestle for R.R. embankment

PERIODIC INSPECTION CHECK LIST

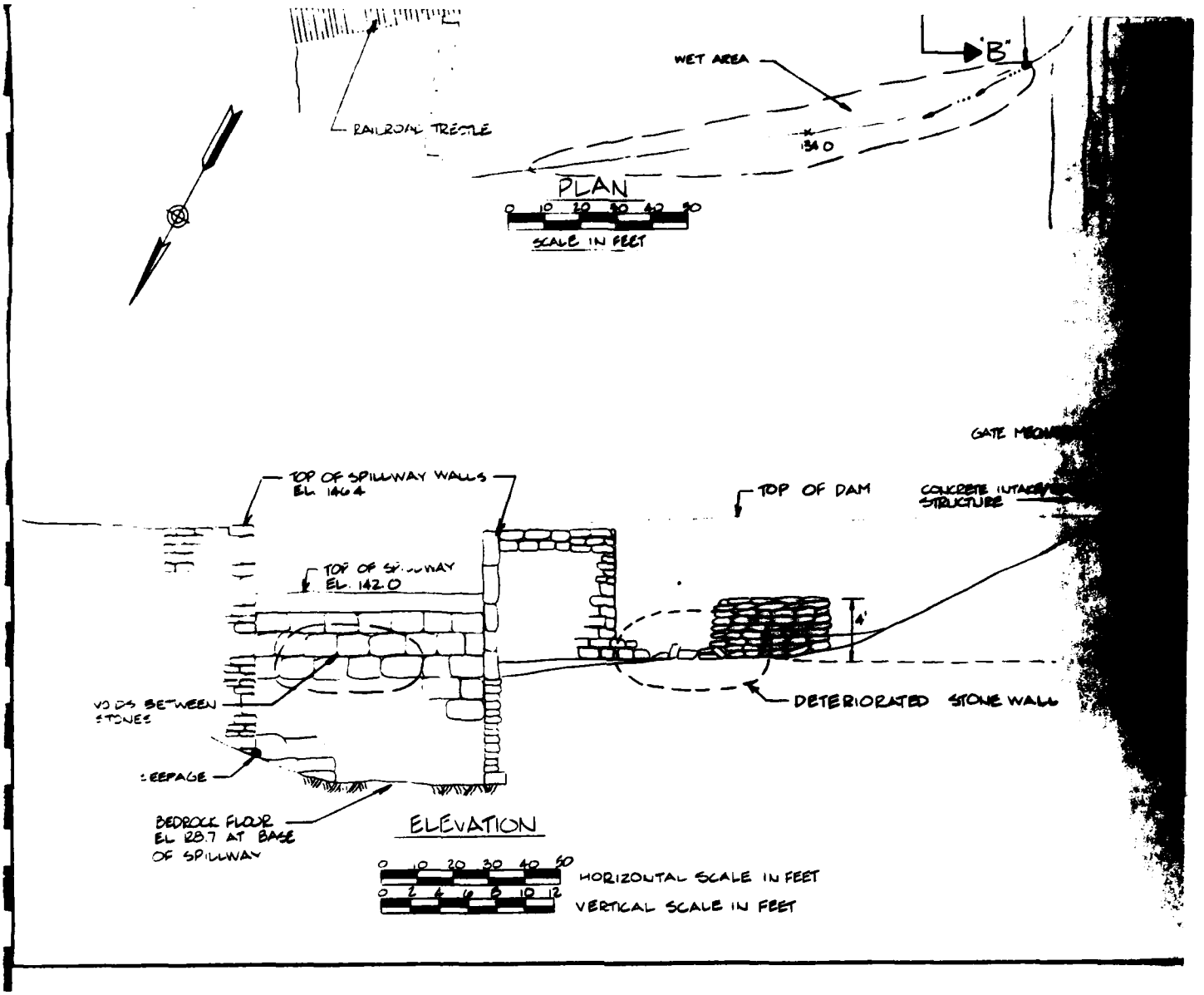
PROJECT Packers Pond Dam DATE Nov. 13, 1980

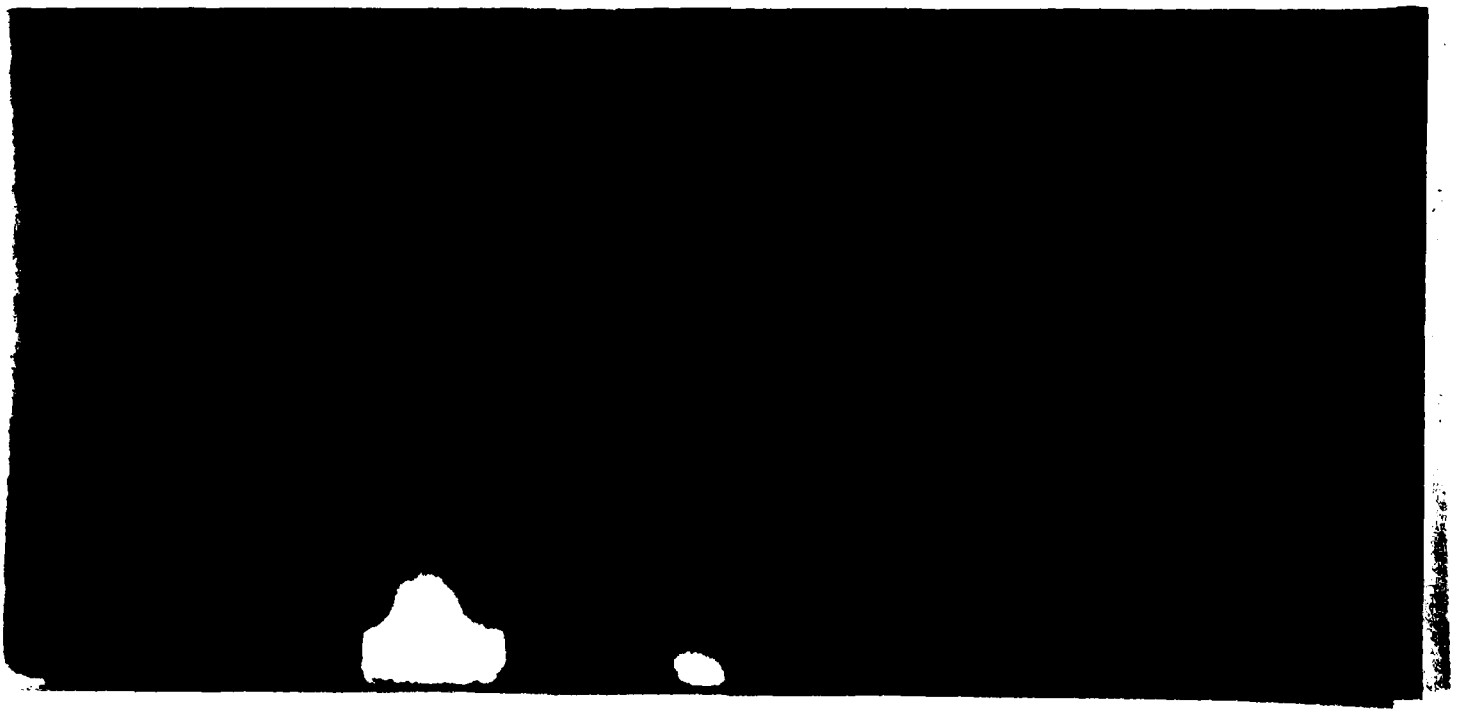
PROJECT FEATURE Intake/Gate Structure BY PMH, JAC, MA, FS

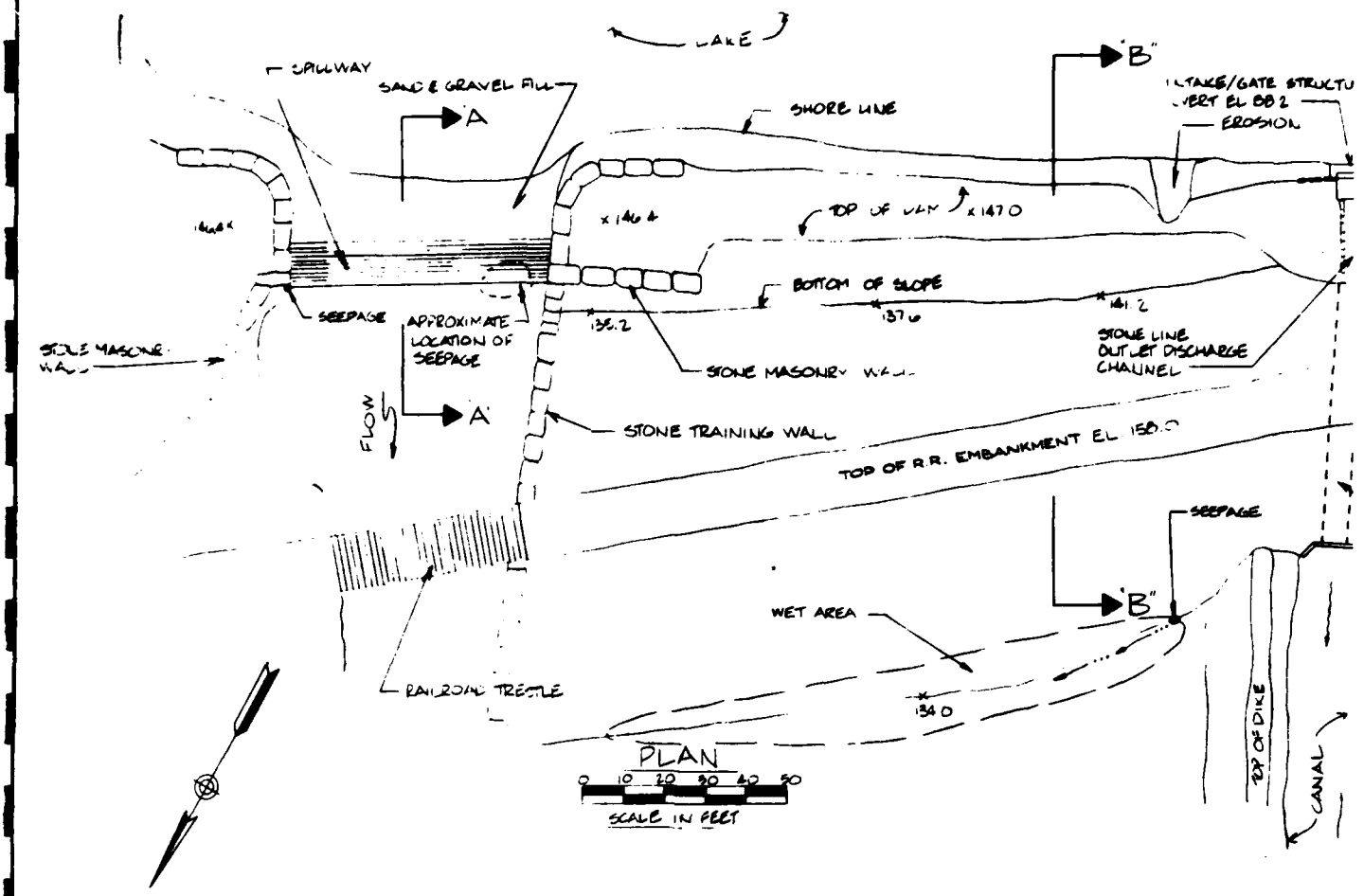
AREA EVALUATED	CONDITION
OUTLET WORKS-CONTROL TOWER	Concrete intake/gate structure with stone lined channel to R.R. embankment d/s
a) Concrete and Structural	
General Condition	Fair
Condition of Joints	Concrete is good, stone channel needs repair
Spalling	Some
Visible Reinforcing	None observed
Rusting or Staining of Concrete	None observed
Any Seepage or Efflorescence	Good
Joint Alignment	N/A
Unusual Seepage or Leaks in Gate Chamber	None observed
Cracks	None
Rusting or Corrosion of Steel	
b) Mechanical and Electrical	
Air Vents	N/A
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	Poor - inoperable gate mechanism, gate could not be observed, intake clogged with debris
Emergency Gates	
Lightning Protection System	N/A
Emergency Power System	
Wiring and Lighting System	

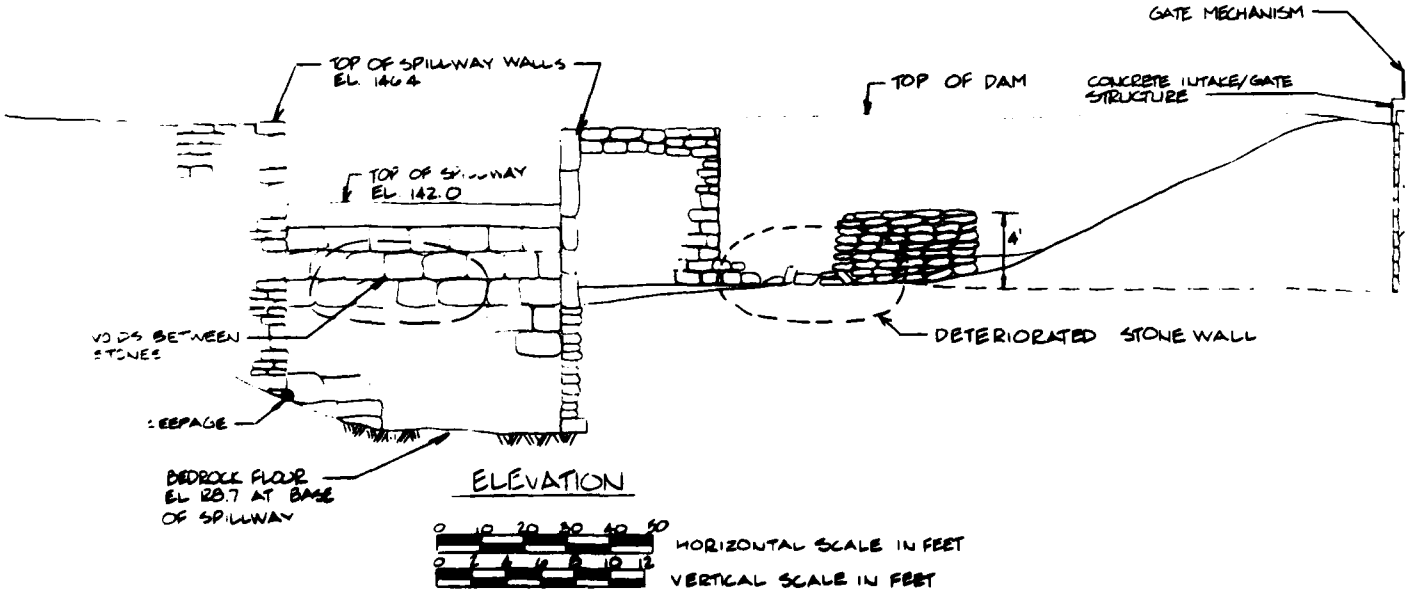
APPENDIX B

ENGINEERING DATA AND CORRESPONDENCE


WET AREA
"B"
RAILROAD TRESTLE
1340
PLAN
0 10 20 30 40 50
SCALE IN FEET
TOP OF SPILLWAY WALLS
EL. 1464
TOP OF DAM
CONCRETE INTAKE STRUCTURE
TOP OF SPILLWAY
EL. 1420
4'
VOIDS BETWEEN STONES
SEEPAGE
DETERIORATED STONE WALL
BEDROCK FLOOR
EL 1397 AT BASE
OF SPILLWAY
ELEVATION
0 10 20 30 40 50
HORIZONTAL SCALE IN FEET
0 2 4 6 8 10 12
VERTICAL SCALE IN FEET




LAKE
SPILLWAY
SAND & GRAVEL FILL
A
B"
SHORE LINE
INTAKE/GATE STRUCTU
VERT EL 88.2
EROSION
x 146.4
TOP OF DAM x 147.0
BOTTOM OF SLOPE
137.0
141.2
SEEPAGE
APPROXIMATE LOCATION OF SEEPAGE
136.2
STONE MASONRY WALL
STONE LINE OUTLET DISCHARGE CHANNEL
FLOW
A'
STONE TRAINING WALL
TOP OF R.R. EMBANKMENT EL 150.0
SEEPAGE
B"
WET AREA
RAILROAD TRESTLE
134.0
TOP OF DIKE
CANAL
PLAN
0 10 20 30 40 50
SCALE IN FEET


GATE MECHANISM
TOP OF SPILLWAY WALLS EL. 146.4
TOP OF DAM
CONCRETE INTAKE/GATE STRUCTURE
TOP OF SPILLWAY EL. 142.0
4'
VOIDS BETWEEN STONES
DETERIORATED STONE WALL
SEEPAGE
BEDROCK FLOOR EL 128.7 AT BASE OF SPILLWAY
ELEVATION
0 10 20 30 40 50
HORIZONTAL SCALE IN FEET
0 2 4 6 8 10 12
VERTICAL SCALE IN FEET

SCALE IN FEET

LILLI BRIDGE ROAD
EL 158.5

NOTES: 1. THIS PLAN WAS COMPILED FROM A CAHN ENGINEERS INSPECTION OF THE DAM DATED NOVEMBER 3, 1980. DIMENSIONS SHOWN ARE APPROXIMATE. NOT ALL TOPOGRAPHIC AND/OR STRUCTURAL FEATURES ARE NECESSARILY IDENTIFIED.

2. NO ELEVATIONS WERE AVAILABLE FOR THE DAM, THEREFORE THE WATER SURFACE ELEVATION OF 142 FOR THE IMPOUNDENT SHOWN ON THE U.S.G.S. PLAINFIELD QUADRANGLE MAP WAS ASSUMED TO BE THE APPROXIMATE N.G.V.D ELEVATION OF THE SPILLWAY CREST. ALL OTHER ELEVATIONS SHOWN ARE REFERENCED TO THE SPILLWAY CREST.

STONE - LINED CHANNEL

APPROXIMATE SIZE OF SHEET IS 3'x2.5'

CAHN ENGINEERS INC. WALLINGFORD, CONNECTICUT ENGINEER	U.S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS

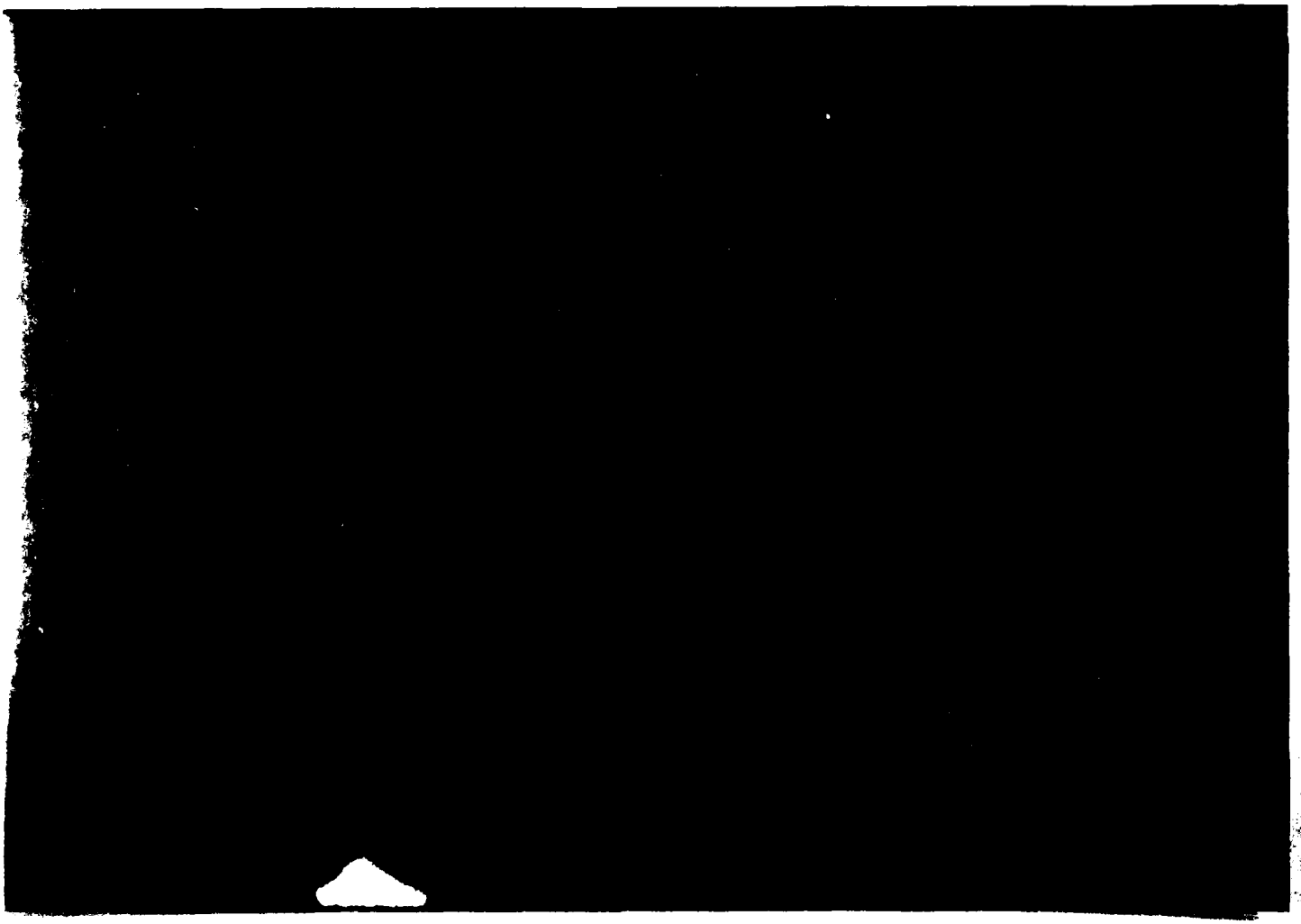
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

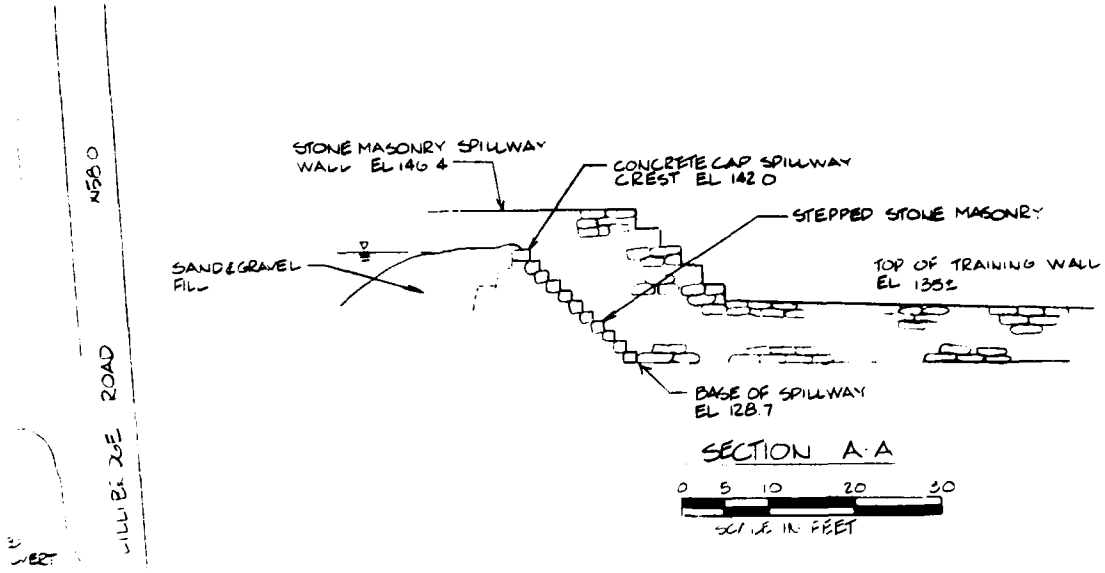
PLAN, ELEVATION & SECTIONS

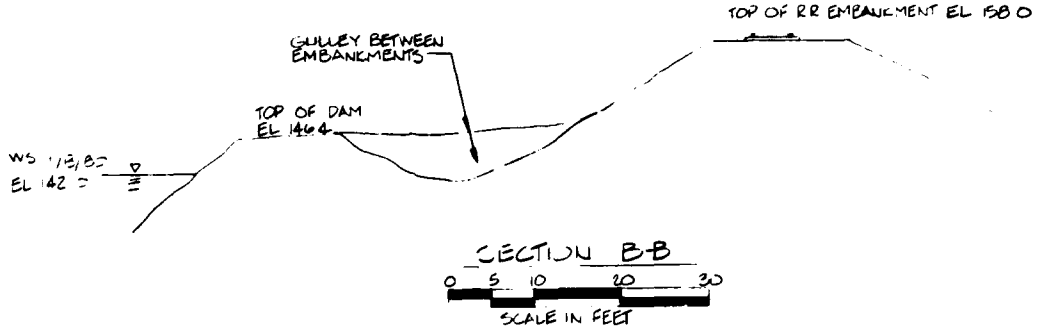
PACKERS POND DAM

MILL BROOK PLAINFIELD, CT

DRAWN BY	CHECKED BY	APPROVED BY	SCALE AS NOTED	
R.F.	[illegible]	[illegible]	DATE DEC 1980	SHEET 8-1







LILLIBRIDGE ROAD EL 158 5

NOTES : 1. THIS PLAN WAS COMPILED FROM A CAHN ENGINEERS INSPECTION OF THE DAM DATED NOVEMBER 13, 1980. DIMENSIONS SHOWN ARE APPROXIMATE. NOT ALL TOPOGRAPHIC AND/OR STRUCTURAL FEATURES ARE NECESSARILY IDENTIFIED.

2. NO ELEVATIONS WERE AVAILABLE FOR THE DAM, THEREFORE THE WATER SURFACE ELEVATION OF 142 FOR THE IMPOUNDMENT SHOWN ON THE U.S.G.S PLAINFIELD QUADRANGLE MAP WAS ASSUMED TO BE THE APPROXIMATE N.G.V.D ELEVATION OF THE SPILLWAY CREST ALL OTHER ELEVATIONS SHOWN ARE REFERENCED TO THE SPILLWAY CREST.

- STONE - LINED CHANNEL

PROXIMATE SIZE OF JET IS 3 x 2.5'

CAHN ENGINEERS INC. WALLINGFORD, CONNECTICUT ENGINEER	U.S. ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS

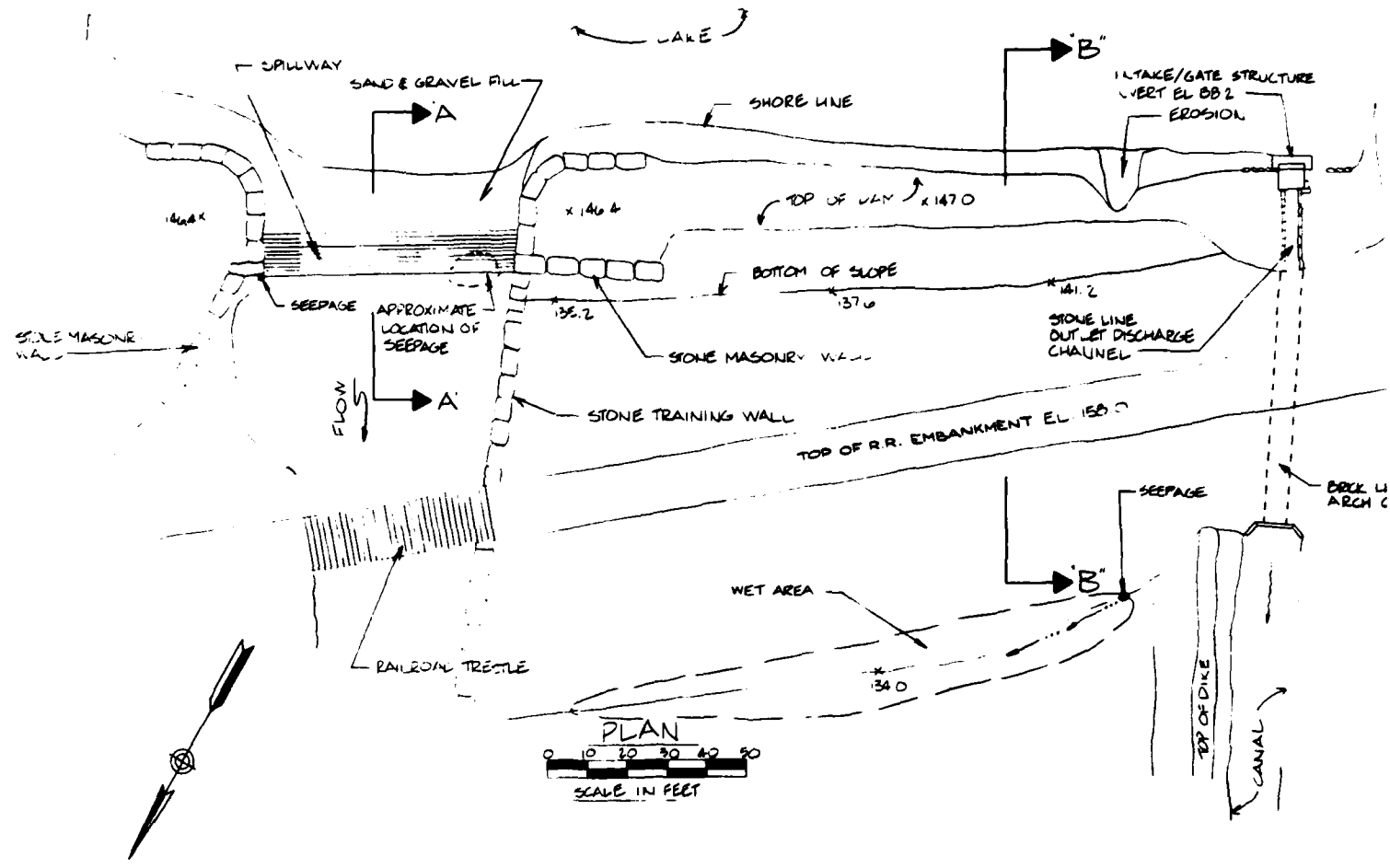
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

PLAN, ELEVATION & SECTIONS

PACKERS POND DAM

MILL BROOK — PLAINFIELD, CT.

DRAWN BY	CHECKED BY	APPROVED BY	SCALE AS NOTED
R.P.	JAC	WHH	DATE DEC. 1980 SHEET 8-1


LAKE
SPILLWAY
SAND & GRAVEL FILL
A
SHORE LINE
B
INTAKE/GATE STRUCTURE
VERT EL 88.2
EROSION
x 146.4
TOP OF DAM
x 147.0
BOTTOM OF SLOPE
141.2
137.6
135.2
SEEPAGE
APPROXIMATE LOCATION OF SEEPAGE
STONE MASONRY WALL
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FLOW
A'
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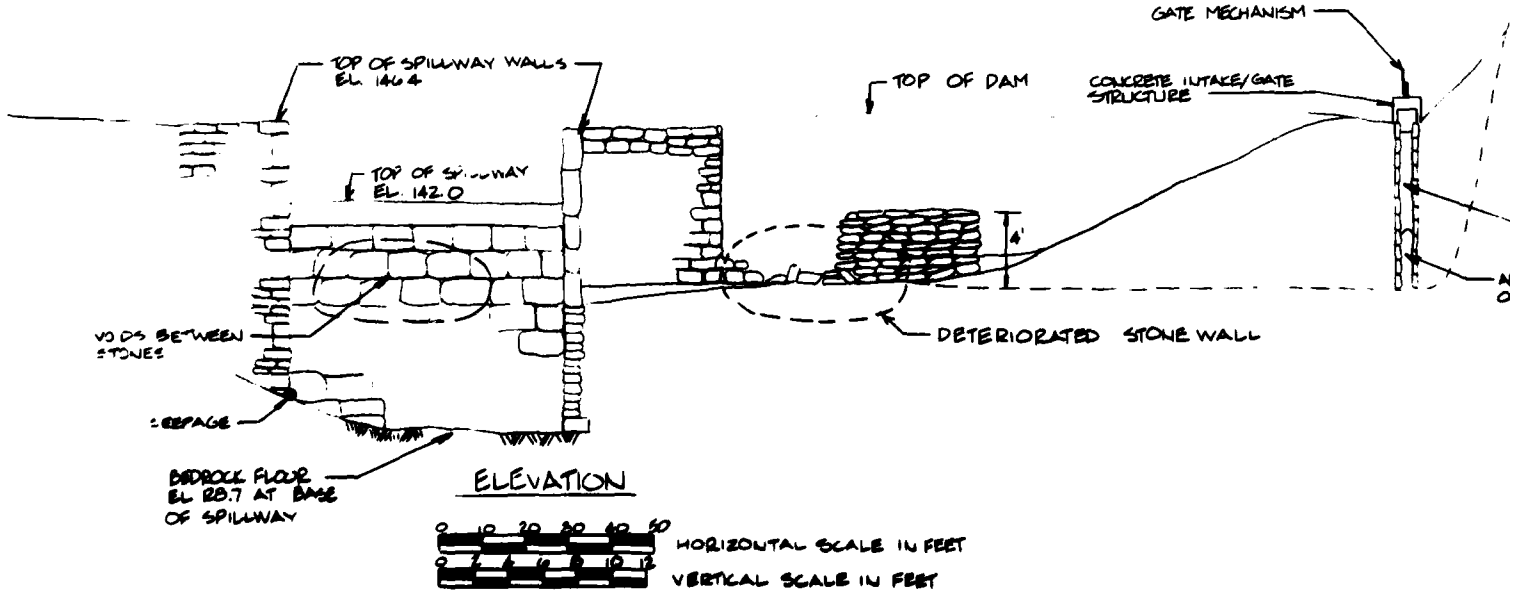
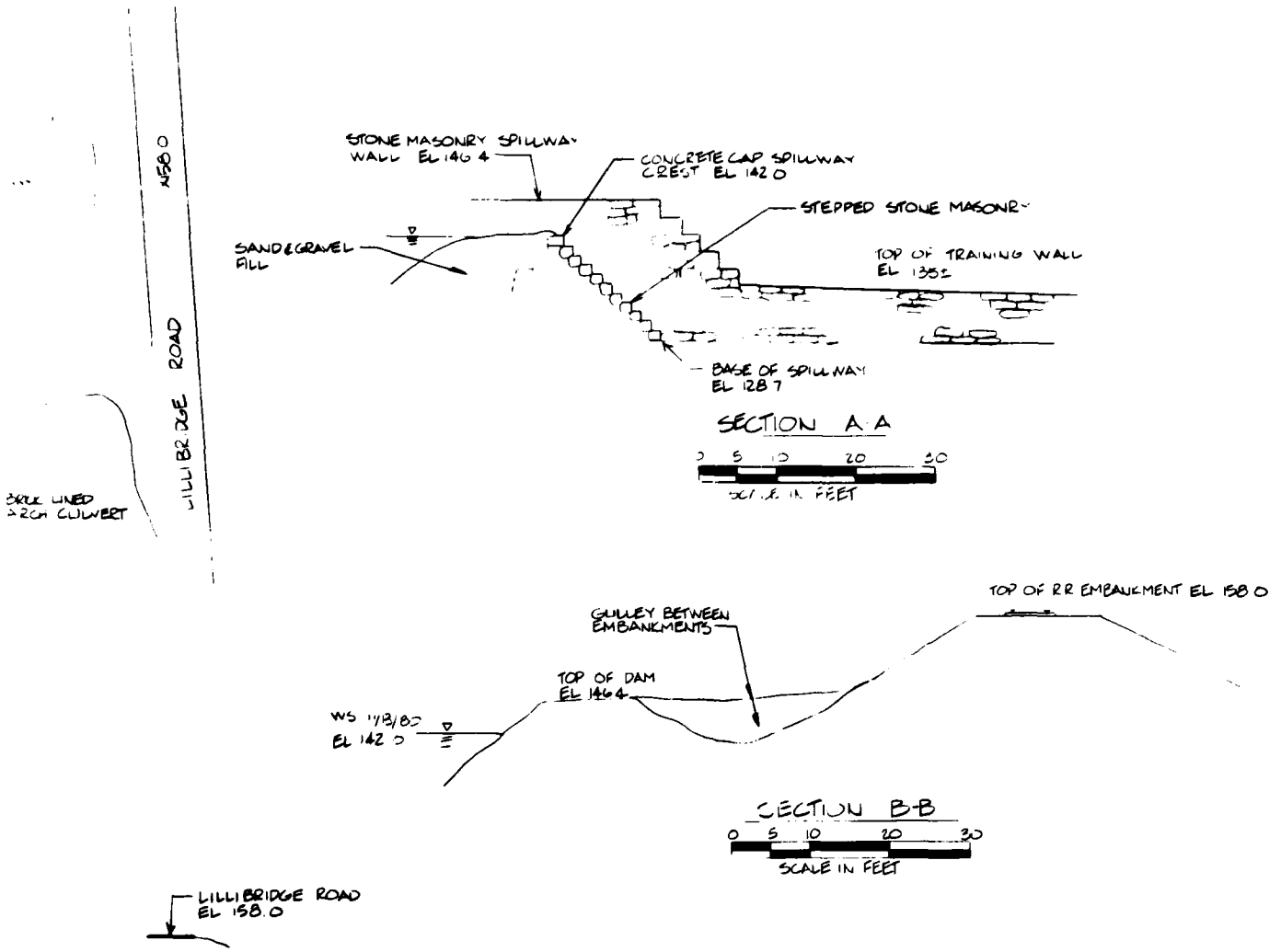
TOP OF R.R. EMBANKMENT EL 150.0
SEEPAGE
B'
WET AREA
RAILROAD TRESTLE
134.0
TOP OF DIKE
CANAL
PLAN
0 10 20 30 40 50
SCALE IN FEET


GATE MECHANISM
TOP OF SPILLWAY WALLS EL 146.4
TOP OF DAM
CONCRETE INTAKE/GATE STRUCTURE
TOP OF SPILLWAY EL 142.0
4'
VOIDS BETWEEN STONES
DETERIORATED STONE WALL
SEEPAGE
BEDROCK FLOOR EL 88.7 AT BASE OF SPILLWAY
ELEVATION
0 10 20 30 40 50
HORIZONTAL SCALE IN FEET
0 2 4 6 8 10 12
VERTICAL SCALE IN FEET



NOTES: 1. THIS PLAN WAS COMPILED FROM A CAHN ENGINEERS INSPECTION OF THE DAM DATED NOVEMBER 12, 1980. DIMENSIONS SHOWN ARE APPROXIMATE. NOT ALL TOPOGRAPHIC AND/OR STRUCTURAL FEATURES ARE NECESSARILY IDENTIFIED.

2. NO ELEVATIONS WERE AVAILABLE FOR THE DAM, THEREFORE THE WATER SURFACE ELEVATION OF 142 FOR THE IMPOUNDENT SHOWN ON THE U.S.G.S. PLAINFIELD QUADRANGLE MAP WAS ASSUMED TO BE THE APPROXIMATE N.G.V.D ELEVATION OF THE SPILLWAY CREST. ALL OTHER ELEVATIONS SHOWN ARE REFERENCED TO THE SPILLWAY CREST.

CAHN ENGINEERS INC. WALLINGFORD, CONNECTICUT ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

PLAN, ELEVATION & SECTIONS

PACKERS POND DAM

MILL BROOK PLAINFIELD, CT.

DRAWN BY	CHECKED BY	APPROVED BY	SCALE AS NOTED
R.F.	JMC	[illegible]	DATE: DEC. 1980 SHEET 8-1

PACKERS POND DAM

EXISTING PLANS

No existing plans are available.

SUMMARY OF DATA AND CORRESPONDENCE

DATE	TO	FROM	SUBJECT	PAGE
June 9, 1975	Victor F. Galgowski Water and Related Sources	James A. Thompson, Buck and Buck Engineers	Dam inspection report	B-21
Dec. 15, 1977	Mr. Robert Gluck	Water Resources Unit	State order to have an engineer inspect and report on dam.	B-22
Sept. 7, 1978	Victor Galgowski Water Resources Unit	James A. Thompson Buck and Buck Engineers	Dam inspection report	B-23

WATER RESOURCES COMMISSION
SUPERVISION OF DAMS
INVENTORY DATA

Inventoried By: _____

Date: June 69

Name of Dam or Pond: Packers Pd

Code No.: T 147 S33 Q13.6 ML 0.5

Nearest Street Location: Lillibridge Rd

Town: Plainfield

U.S.G.S. Quad.: Plainfield

Name of Stream: Mill Br.

Owner: ROBERT FLUCK

Address: RFD #1 564-2324
PACKER'S ROAD
PLAINFIELD

LONG 71-56.9
LAT 41-39.9

Pond Used For: REC.

DA 17.95sm
35.3

Dimensions of Pond: Width _____ Length _____ Area 1

Total Length of Dam: 380 Length of Spillway: 60'

Location of Spillway: _____

1880?

Height of Pond Above Stream Bed: 15'

Height of Embankment Above Spillway: 3

Type of Spillway Construction: stone

Type of Dike Construction: Fill

Downstream Conditions: road railroad

Summary of File Data: _____

Remarks: tracks and embankment for railroad immediately downstream

Would Failure Cause Damage? yes Class BC

JOHN J. MOZZOCHI AND ASSOCIATES
CIVIL ENGINEERS

GLASTONBURY, CONN.
317 HEBRON AVENUE
PHONE 633-8401

PROVIDENCE 3, R. I.
198 DYER STREET
PHONE GASPEE 1-0450

JOHN J. MOZZOCHI
ASSOCIATES
OWEN J. WHITE
JOHN LUCHS, JR.
ECTOR L. GIOVANNINI

June 29, 1965

REPLY TO: Glastonbury

William P. Sander-Engineer-Geologist
Water Resources Commission
State Office Building
Hartford 15, Connecticut

Re: Our File 57-73-71
Packers Pond
Plainfield, Connecticut

Dear Mr. Sander:

In accordance with your letter of May 3rd, I made an inspection of the referenced dam on June 28th and found that it is in substantially good condition with the exception that the earth dike is heavily overgrown with brush and trees, even up to 24 inch diameter.

Apparently the 48" diameter sluice-way at the south end of the dam is supposed to keep the pond level about 3 - 4 feet below the spillway, since the gate on the sluice-way has been removed, but due to a collection of debris at the entrance to the sluice-way, the pond is actually at spillway level.

The overall length of the earth dam is about 300 feet with a stepped masonry spillway about 50 feet wide and 20 feet high at the north end of the dam. This spillway is founded on ledge and, although several small leaks were noted through the masonry steps, I believe they are of no consequence.

A very high railroad embankment parallels the dam with a semi-circular 6 foot stone culvert for the sluice-way discharge and a 50' wide trestle, on ledge, at the spillway location. If the dam were to fail, the discharge would be controlled and channeled through these passages. Therefore, the failure of this dam is not, in my opinion, of serious concern. However, as a matter of principle, I do recommend that the owner be required to remove all brush and trees from the dam.

Very truly yours,

John J. Mozzochi and Associates
Civil Engineers

JJM:hk

INTERDEPARTMENT MAIL

DATE December 30, 1966

TO: File

DEPARTMENT

FROM: William O'Brien

DEPARTMENT

SUBJECT: Packers Pond Dam, Plainfield

On December 29, 1966, this office received a call from Mr. Gosselin, State Representative from Plainfield who was calling on behalf of the owner of Packer Plastics, Inc. The owner had noticed some seepage from the toe of a railroad embankment in the rear of his property and was concerned that it might have something to do with the security of the dam on Packers Pond.

I visited the site with Mr. Gosselin, Mr. John Gluck, the assumed owner of the dam, his son Robert, and one of the owners of Packer Plastics. The seepage was located approximately 150' to 200' downstream from the dam and on the other side of a railroad embankment and in my opinion had no relation to the security of the dam. (see attached sketch) The drainage ditch between the dam and railroad embankment was dry indicating that drainage through the earth embankment was below the ground surface. The seepage noted could quite probably be due to seepage from water in the canal or from the culvert beneath the tracks because this water was about 3 feet above the noted seepage.

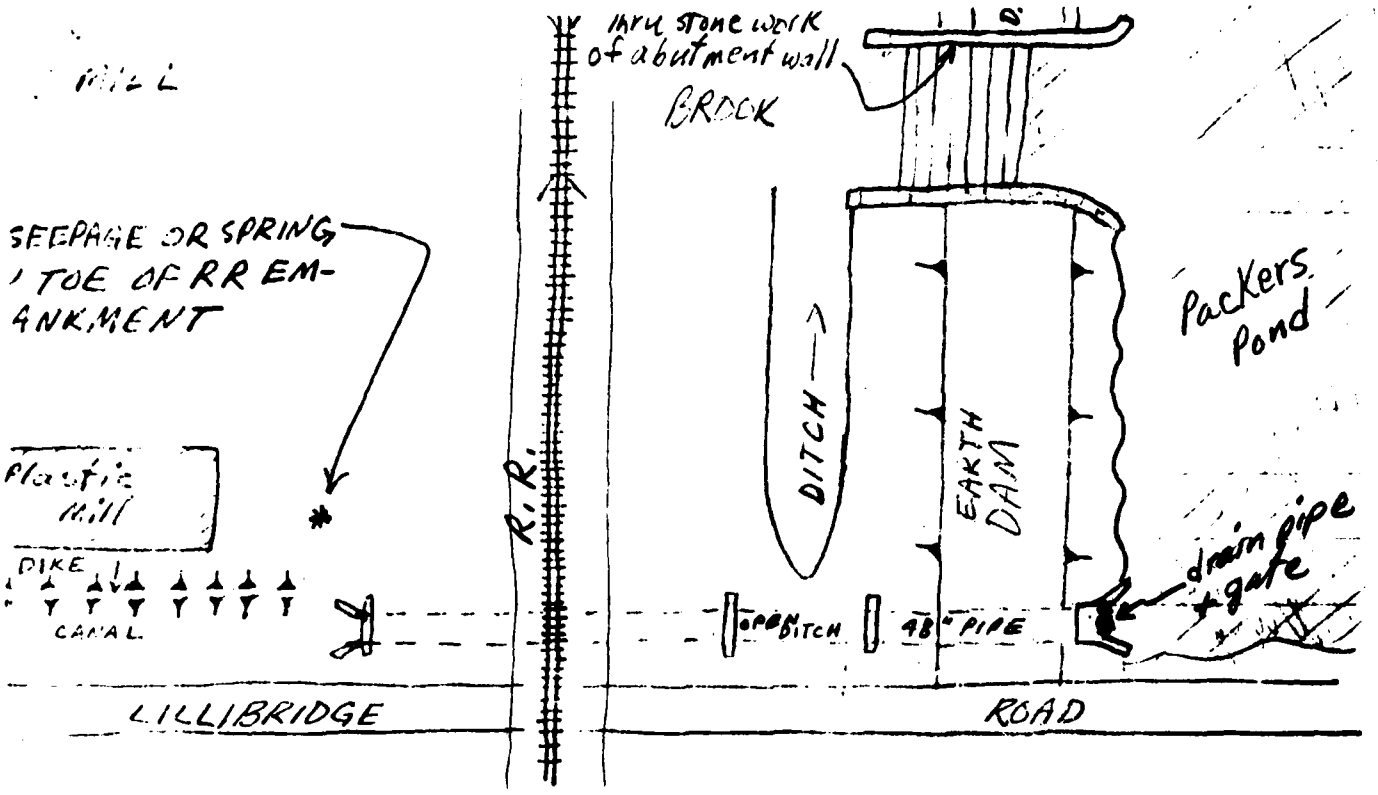
The earth dam had many trees on it and the owner was advised that they should be removed. There was some leakage through the stone of the north abutment of the spillway but the water had no signs of turbidity. The dam and spillway are very substantial and there seemed to be no cause for any immediate concern. A letter is being sent to a consulting engineer for a report.

WHO:hmy

Jan. 9, 1967

I spoke to Mr. Treble, Maintenance of way Dept, N.H. R.R. in New Haven about engrs. report of Jan 1, 1967. I explained location of site & he said a maintenance man would check it tomorrow. He gave me the address of R.J. Philips to write to.

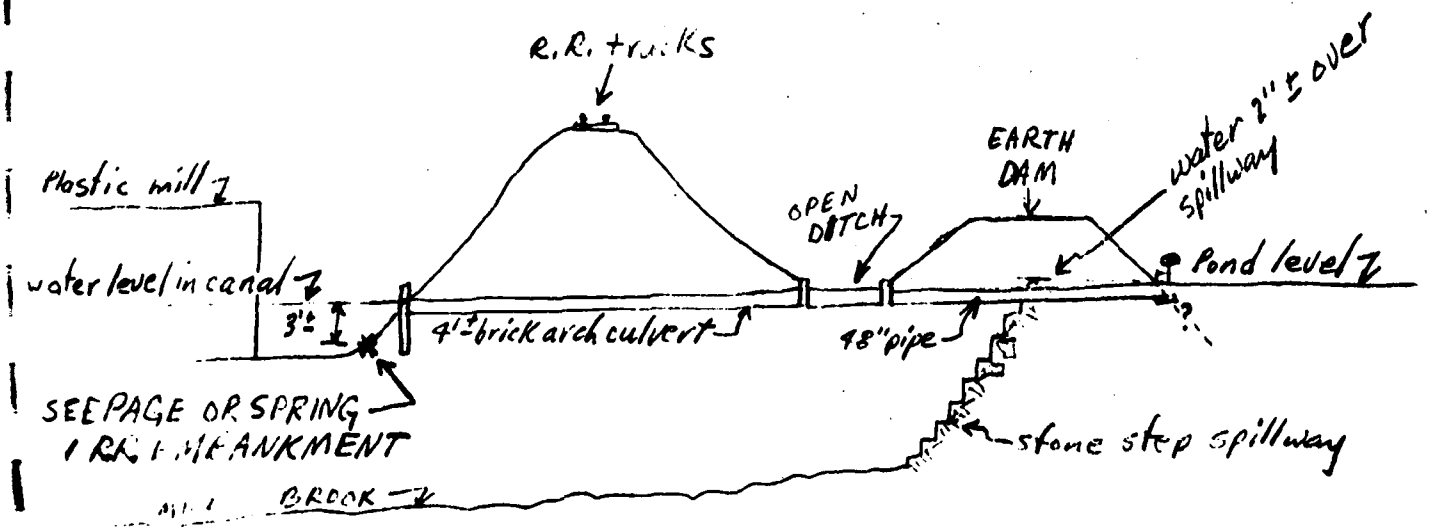
W.H.O.



PLAN VIEW

PACKERS POND DAM - PLAINFIELD 12/29/66

W.H.O.



PROFILE VIEW

A. M. McKENZIE
CIVIL ENGINEER
M. AM. SOC. C. E.

HYDRAULICS
WATER SUPPLY
LAND DEVELOPMENT

1300 MAIN STREET
SOUTH MERIDEN, CONN.

January 7, 1957.

Water Resources Commission,
State of Connecticut,
State Office Building,
Hartford, 15,
Connecticut.

Ref: Packers Pond Dam,
Town of Plainfield.

Gentlemen:

Yesterday I went to Plainfield and made an examination of the above dam, as requested in your letter of January 3. The dam seems to be in fair condition and a detailed report will be forwarded in a few days when the photographs are ready.

At the south end of the dam, just a few feet off the edge of Lillibridge Road, there there is a pipe drain, about 48"ø, extending thru the dam and the discharge from this is carried under the railroad embankment by a brick arch culvert about 5' wide and 5' or 6' high. At the downstream end the brick arch is quite disintegrated and I feel sure that there are cracks in the brick work back under the embankment thru which water is seeping and finding it's way to the toe of the embankment immediately in the rear of the Packer Plastics Plant. There is an area at the toe of the embankment, immediately north of the culvert, some 40' long which appears to be wet and sliding a little. A small hole has been dug here and the main flow of water is now coming from this hole. The flow might fill a 6"ø pipe.

In my opinion the matter should be brought to the attention of the Railroad Company at once so that an investigation can be made. If the embankment is becoming water soaked the continued passage of heavy freight cars over the tracks could cause a serious slide. During a conversation with the owner of the Plastics Plant I told him what I thought was the source of the water. According to the owner the condition has existed for only three or four weeks.

Yours very truly

A. M. McKenzie

A. M. McKENZIE
CIVIL ENGINEER
M. AM. SOC. C. E.

HYDRAULICS
WATER SUPPLY
LAND DEVELOPMENT

1300 MAIN STREET
SOUTH MERIDEN, CONN.

January 13, 1967.

Water Resources Commission,
State of Connecticut,
State Office Building,
Hartford, 15,
Connecticut,

Ref: Packers Pond Dam,
Town of Plainfield.

Gentlemen:

As instructed in your letter of January 3, I have made an inspection of the above Dam and submit the following report for your imformation.

Packers Pond is about 3600' long with an average width of about 400'. The upper part of the pond is swampy and the greatest depth of water is probably not over 10'. The Pond does not seem to have any particular use and the water appears to be highly polluted.

The overall length of the Dam is about 380' and the south end of the earth fill runs into the embankment forming Lillibridge Road. The earth fill has a maximum height of 16' at the spillway with an average top width of 15'. The slopes of the earth fill are about 1 : 1 and the top and slopes are entirely covered with small and large trees with diameters up to 18". The freeboard, with water at spillway elevation, is 5' to 6'

The spillway, about 60' long, is entirely of stone masonry with the downstream face built in steps about 12" high; the overall height is 14'. The upper four courses of stone are well squared, with mortar still in the joints but the lower courses are falling apart in places and there is little mortar left in the joints - see photos #6, #7 . Protruding from the top course of stone are several steel rods which once supported flash boards. The wing walls are of roughly squared local stone masonry but the mortar has fallen from most of the joints. However, the line of the stone work is still fairly good. The top of the wing walls is 4' above the spillway.

At the south end of the dam, perhaps 20' from the Lillibridge Road embankment, there is a 48"ϕ pipe thru the dam with a concrete structure, trash rack and a gate operating hoist at the intake end. The gate is

A. M. McKENZIE
CIVIL ENGINEER
M. AM. SOC. C. E.

HYDRAULICS
WATER SUPPLY
LAND DEVELOPMENT

1300 MAIN STREET
SOUTH MERIDEN, CONN

missing, part of the trash rack is broken away and the intake is almost entirely clogged with rubbish and old tires. The 48" pipe discharges into a narrow, stone lined, open ditch about 12' long and then into a brick arch conduit 5' wide which carries the stream under the railroad fill. At this point the earth fill of the dam and the railroad embankment come together. I believe that a break in this culvert, under the railroad track, is probably the source of water which is seeping from the toe of the fill in the rear of the Tacker Plastics Plant; this condition is more fully described in my letter of January 7.

A branch line of the N. Y., N.H. & H. RR. passes just below and at a slight angle to the axis of the dam. At the spillway the center line of the track is about 70' downstream and some 15' higher that the top of the spillway. The RR. is carried over Mill Brook on a plate girder bridge which is supported on stone masonry abutments. The clear opening between the abutments at the stream bed is 25' and the clear height to the bottom of the plate girder is 22'. This opening is ample to take any probably flood discharge. A complete failure of the brick culvert under the RR. would divert the flow from the 48" pipe into the gulley between the RR. and the downstream toe of the dam and might result in a washout of the earth fill of the dam. For this reason the condition of the brick culvert should be investigated at once.

The stream from the 48" drain, below the RR. track, is carried in an open ditch just a few feet south of the Plastics Plant and parallel to the building. The ditch is partially clogged with rubbish and brush and I doubt that it will carry the full flow, even if cleaned out, of the 48" drain. In order to prevent possible damage to the plant the trash rack should be put in good shape and an operable gate should be installed. This may be a matter between the owner of the Pond and the Plastics Plant; I do not know what the water rights of the latter may be but the plant does require water for cooling purposes. The Owner of the Plastics Plant told me that the Pond is owned, or controlled, by Mr. John Gluck, Tacker Road, Plainfield. The ownership should be checked by your Office.

There is a hazard involved in the situation here tho it does not appear to be a serious one. The stream, Mill Brook, passes under Tackorville Road about 500' below the Dam and empties into the Quinnebaug River some 1500' farther downstream. There is very little habitation and no

A. M. McKENZIE
CIVIL ENGINEER
M. AM. SOC. C. E.

HYDRAULICS
WATER SUPPLY
LAND DEVELOPMENT

1300 MAIN STREET
SOUTH MERIDEN, CONN.

roads along the lower part of the stream. The earth fill of the dam is in good condition but the spillway is not and should be inspected once a year. The drainage area above the dam has many swamps and the runoff would not be rapid. The drainage area, which is quite large, has not been calculated yet but it will be a little later.

The important point is to have the condition of the brick culvert checked and, if water is getting into the RR. embankment, to have some sort of repair made.

Yours very truly

A.M.McKenzie.

Enclosure - 9 - photos.

January 30, 1967

Mr. John Gluck
Packer Road
Plainfield, Connecticut

Dear Mr. Gluck:

This office has recently received an engineering consultant's report on the dam at Packer's Pond in Plainfield. According to our information you are the owner of this dam, and according to the State of Connecticut General Statutes (copy enclosed), the Water Resources Commission has jurisdiction over all dams or similar structures, "...which, by breaking away or otherwise, might endanger life or property."

The report contains the following,in part: "The slopes of the earth fill are about 1:1 and the top and slopes are entirely covered with small and large trees with diameters up to 18." ..."At the south end of the dam, perhaps 20 feet from the Lillibridge Road embankment, there is a 48 inch pipe through the dam with a concrete structure, trash rack and a gate operating hoist at the intake end. The gate is missing, part of the trash rack is broken away and the intake is almost entirely clogged with rubbish and old tires."

The report continues: ..."A complete failure of the brick culvert under the R.R. (or a complete clogging of it with debris) would divert the flow from the 48 inch pipe into the gulley between the R. R. and the downstream toe of the dam and might result in a washout of the earth fill of the dam."

On the basis of this report, the following work should be done:

1. Cut down and remove all trees from the earth embankment.

2. Repair or replace the trash rack at the gate.

3. Make provisions so that toe of dam will not be washed out in event of failure or clogging of the culvert under R. R. tracks.

We would appreciate a reply at your earliest convenience.

Very truly yours,

William P. Sander
Engineer - Geologist

WPS: js

enclosure

A. M. McKENZIE
CIVIL ENGINEER
M. AM. SOC. C. E.

HYDRAULICS
WATER SUPPLY
LAND DEVELOPMENT

1300 MAIN STREET
SOUTH MERIDEN, CONN.

March 29, 1967.

Water Resources Commission,
State of Connecticut,
State Office Building,
Hartford, 15,
Connecticut.

Ref: Packers Pond Dam,
Town of Plainfield.

Gentlemen:

After looking over the dam at Beachdale Pond in Voluntown I returned by way of Plainfield to see what the situation might be there. The trees on the earth fill part of the dam are being cut down and are lying where they fell. There are three of the largest trees which have not yet been cut. In a case of this type I would prefer to see the trees left as the root systems help to hold the earth fill together if the dam should be overtopped by a flood.

I am wondering if there has been any comment by the Rail Road on the condition of the brick arch culvert under the tracks. The collapse of the culvert, with the absence of a gate, would result in the flow thru the opening at that end of the dam going toward the stream along the depression between the earth fill and the railroad embankment. This might result in considerable damage to both the dam and the railroad fill. This is mentioned in paragraph 2, page 2, of my report of January 12.

Yours very truly

A.M. McKenzie.

A. M. McKENZIE
CIVIL ENGINEER
M. AM. SOC. C. E.

HYDRAULICS
WATER SUPPLY
LAND DEVELOPMENT

1300 MAIN STREET
SOUTH MERIDEN, CONN.

April 5, 1967.

Water Resources Commission,
State of Connecticut,
State Office Building,
Hartford, 15,
Connecticut.

Attention Mr. Sander.

Ref: Packers Pond Dam,
Town of Plainfield.

Gentlemen:

This will acknowledge receipt of your letter of March 30, 1967, enclosing copy of a letter from the N.Y., N.H. & H. Railroad regarding the condition of the culvert just below the Packers Pond Dam.

The letter from the Railroad states that they are planning on making repairs to the damaged headwalls, the present condition of which has existed for several years.

The Owner of the Plastics Plant, not over a 100 feet below the Railroad embankment, told me that the leak from the bottom of the fill had been first observed about a month before my first visit to the site which was on January 6th. I am inclined to think that the brick arch culvert is breaking up back of the headwalls, under the embankment and that repairs to more than just the headwalls are required. The simplest thing might be to push a corrugated iron culvert thru the entire length of the brick arch which may have been there a hundred years or more and is probably disintegrating over it's entire length. Of course, a new gate should be installed at the intake to the drain from the pond, but it is a question as to whether you will want to ask that from the Owner.

Yours very truly

A. M. McKenzie.

October 2, 1968

Mr. John Gluck
Packer Road
Plainfield, Connecticut

Subj: Packers Pond Dam
Plainfield

Dear Mr. Gluck:

In a review of our files, we find that you never answered our letter of December 1, 1967.

On January 30, 1967, we wrote and requested that you:

1. Cut down and remove all trees from the dam..

2. Repair or replace the trash rack at the gate.

3. Make provisions so that the toe of the dam will not be washed out in the event of failure or clogging of the brick aivert under the railroad tracks.

We would like a reply by October 16, 1968 concerning your intentions.

Very truly yours,

William H. O'Brien III
Civil Engineer

WHOIII:vhb

Water & Related Resources

March 15, 1972

Mr. David R. Wagner
First Selectman
Town of Plainfield
Plainfield, Connecticut 06374

Re: Packers Pond Dam
Plainfield

Dear Mr. Wagner:

At your request, the undersigned and Vic Galgowski of this office met with you and inspected the subject dam with you on March 8, 1972.

Your concern is that the gate at the south end of the dam leading to the canal to the former Packer Plastics Corp. is releasing an excessive amount of water and that this has caused a partial collapse of a culvert under Lillibridge Road and has also caused a flooding of and some damage to Packer Road. In order to make repairs to these roads, you need some control over the water.

There is no gate or stem on this opening and the flow of water is controlled by the amount of debris clogging it, which was considerable. It would obviously be to your advantage to have a gate installed here. From a safety standpoint, this dam and gate are under the jurisdiction of this department because, under Public Act #672 Section 130, these structures are ones which, by breaking away or otherwise, might endanger life or property.

There appeared to be no immediate cause for concern as to the safety of the dam although we are concerned with providing a standard gated structure on this canal since a sudden release of water from this source might endanger the roadways below and a fence should be placed around the canal to prevent someone from falling into it. We are also concerned with a significant leak at the base of the masonry on the north abutment of the spillway. There is a two foot diameter hole, six feet deep in the top of the earth section just north of this leak, indicating that some of the embankment material is probably being carried out with the leaking water. A leak was also noted at this location on December 29, 1966. There was no obvious location of where this water was entering on the upstream side. It probably originates at quite a depth, and the pond should be lowered to determine its exact location and the leaks repaired.

You informed us that there is a question of ownership of the dam and the gate and the responsibility for the maintenance thereof. We are requesting the state's Attorney General to make a title search of the dam to make this determination.

From the standpoint of water control, it would be desireable if the permanent repairs to the roadways could be postponed to the low flow summer months, but if you feel that something should be done before then, it would probably be necessary to physically close the opening from the dam into the canal. Since the entire flow of Mill Brook can be accommodated by the spillway, the flow through the canal could be shut off without concern of water overtopping the dam. If you plan to shut down this flow, it would be necessary for you to obtain permission to do this and to submit a sketch of how you propose to do it for our review.

Since the only observed drawdown capability of the pond is through this canal, you should consider matching the capacity of any new road culverts with the maximum rate of drawdown possible through the opening in the dam. If you have any further questions, please advise.

Very truly yours,

William M. O'Brien, III
Civil Engineer

WMO:ljg

cc: Stephen C. Thomson, Director

Mr. Robert Gluck
R.F.D. #1
Plainfield, CT

Re: Packers Pond Dam
Plainfield

Dear Mr. Gluck:

According to the records of this office, you are the owner of the Packer Pond Dam in Plainfield.

This dam was inspected on 17 April 1973 in accordance with Section 25-110 (1971 Supplement) of the General Statutes (copy enclosed). The Department of Environmental Protection has jurisdiction over all dams or similar structures "--which, by breaking away or otherwise, might endanger life or property". It has been determined that this dam is under the jurisdiction of this department.

The inspection indicated the following discrepancies which should be corrected immediately:

1. Cut down and remove all trees from the earth embankment.
2. Remove debris from vicinity of gate valve.
3. Repair or replace trash rack at the gate valve.
4. Repair gate valve.
5. Water is leaking through dam just northeast of the spillway. This can be seen on the downstream side of the dam and through the 6 feet deep hole in the top of the dam. The pond should be drawn down so the upstream face of the dam can be repaired.
6. The two large holes on the top should be backfilled after the leak in the face has been repaired.

The Water and Related Resources Unit of the Department of Environmental Protection shall be notified within two weeks what steps you plan to take to

place your structure in a safe category.

Since this matter relates to public safety in the Town of Plainfield, a copy of this letter is being sent to your First Selectman.

Very truly yours,

Morgan S. Ely
Sr. Civil Engineer
Water & Related Resources

MSE:ljg

cc: David R. Wagner
RRR-Sent certified

Enclosure

BUCK & BUCK

ENGINEERS

98 WADSWORTH STREET, HARTFORD, CONNECTICUT 06106

JAMES A. THOMPSON
ROBINSON W. BUCK
LAWRENCE P. BUCK

HENRY WOLCOTT BUCK
1931-1965
ROBINSON D. BUCK
1936-1950

COMM. 5713-116

June 9, 1975

Mr. Victor F. Galgowski
Supt. of Dam Maintenance
Water & Related Resources
Dept. of Environmental Protection
State Office Building
Hartford, Conn. 06115

Re: Packer's Pond Dam
Plainfield

Dear Mr. Galgowski:

At your request I inspected the subject dam on June 6, 1975, and herewith report on that inspection.

The dam has a masonry step spillway that is in relatively good condition. I could find only one stone missing, near the north abutment, and the stones above the gap are successfully bridging the gap. On the north abutment itself, one large cap stone has been displaced westward. It should be reset before it goes any further.

The embankment of the dam is completely overgrown making inspection very difficult. The trees and brush on this dam do not really represent a potential root penetration hazard because the dam embankment is buttressed by a huge railroad embankment which is immediately adjacent to and downstream of the dam.

The outlet structure is at the southerly end of the dam. The control gate is missing and the stone channel between the gate structure and the downstream railroad culvert is collapsing. The callapsing channel is currently braced with timber shoring.

The collapsing channel does not represent a serious hazard to the dam but it could cause trouble with the railroad culvert. The matter could easily be resolved by installing a pipe in the place of the stone culvert. The lack of a control gate is of no consequence.

All the above matter should be considered normal maintenance and the owner should be advised to make the appropriate repairs.

Sincerely,

BUCK & BUCK

James A. Thompson

James A. Thompson

JAT:dlb

COPY

STATE OF CONNECTICUT

DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

COPY

ORDER

WHEREAS, Robert A. Gluck is the owner or otherwise has control of a dam known as Packers Pond Dam located on Mill Brook north of Lillibridge Road in the Community of Plainfield; and,

WHEREAS, following investigation, the Commissioner of the Department of Environmental Protection has discovered certain deficiencies at the dam; and,

WHEREAS, claimed repairs have been made without knowledge of this Department.

NOW, THEREFORE, pursuant to Section 25-111 of the Connecticut General Statutes, Robert A. Gluck is ordered to cause an inspection of said dam be made by an engineer registered in the State of Connecticut and to submit a copy of his findings to the Commissioner for action. Said report to be submitted within ninety (90) days of this order.

This order shall become final thirty (30) days from the date of its issuance unless, prior to that time, an administrative hearing is requested pursuant to Section 25-117 of the Connecticut General Statutes, and an answer is filed in accordance with the Rules of Practice, Department of Environmental Protection, Section 22a-8-1 et seq., Regulations of Connecticut State Agencies.

Issued as an order of the Commissioner of Environmental Protection this 15th day of December, 1977.

Stanley J. Pac, Commissioner

SJP:ljk

SENT CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Water Resources Unit
Telephone no. 566-7245

B-22

BUCK & BUCK

ENGINEERS

98 WADSWORTH STREET, HARTFORD, CONNECTICUT 06106

JAMES A. THOMPSON
ROBINSON W. BUCK
LAWRENCE P. BUCK

HENRY WOLCOTT BUCK
1921-1965
ROBINSON D. BUCK
1926-1969

COMM. 5713-116

September 7, 1978

Mr. Victor Galgowski,
Water Resources Division,
Department of Enviromental Protection,
State Office Building,
Hartford, Connecticut 06115

Reference: Packer's Pond Dam
Plainfield

Dear Vic:

We inspected the subject dam on July 28, 1978 in the company of Mr. Robert Gluck, the owner of the dam. At the time of our inspection, there was no flow over the spillway, therefore it was possible to make a detailed inspection of the spillway, which was not possible during our inspection of June 6, 1975.

The status of the dam today is about the same as reported in 1975 except we found a hole in the earthen portion of the top of the spillway just upstream of, or behind, the masonry steps. This hole was located near the southerly abutment. We could detect no distress or movement in the masonry steps near the hole. We recommend that the owner fill the hole with a mixture of gravel and clay which will form a stable impervious plug. Before filling, the hole should be enlarged to its full depth by backhoe, to provide sufficient space for a man to compact the plug. The fill or plug should be placed in 6" layers, with each layer compacted by pneumatic tamper.

The items needing correction in 1975 should also be completed at this time. A copy of our 1975 report is enclosed for your reference.

Sincerely yours,

BUCK & BUCK

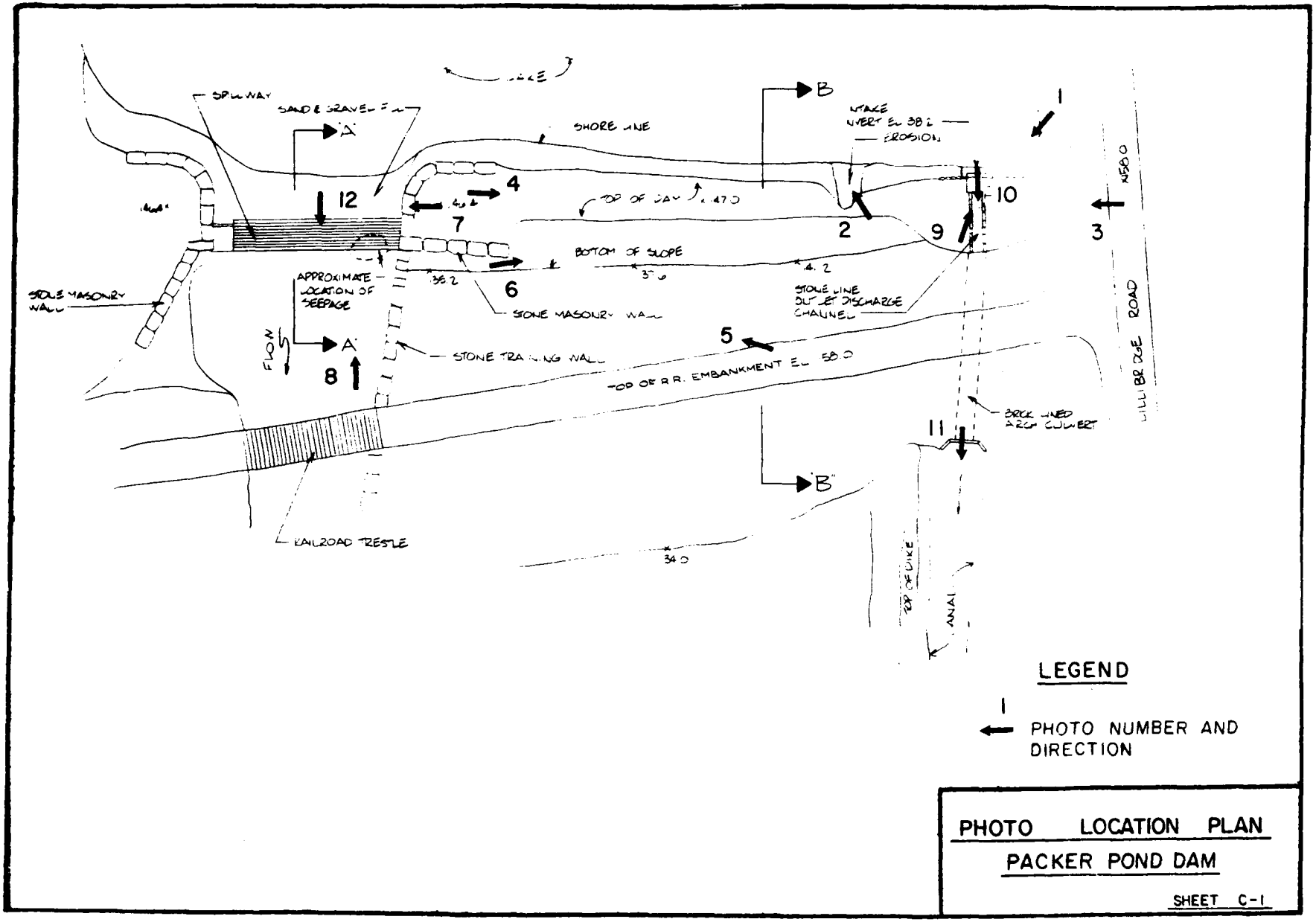
James A. Thompson

James A. Thompson

JAT:fb
Enc.

APPENDIX C

DETAIL PHOTOGRAPHS


SPILLWAY
SAND & GRAVEL FILL
LAKE
SHORE LINE
INTAKE INVERT EL 38.2
EROSION
TOP OF DAM EL 47.0
BOTTOM OF SLOPE
APPROXIMATE LOCATION OF SEEPAGE
STONE MASONRY WALL
STONE TRAINING WALL
FLOW
STONE LINE OUTLET DISCHARGE CHANNEL
TOP OF R.R. EMBANKMENT EL 58.0
BRICK LINED ARCH CULVERT
RAILROAD TRESTLE
TOP OF DIKE
ANAI
LILLI BRIDGE ROAD
A
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LEGEND
PHOTO NUMBER AND DIRECTION
PHOTO LOCATION PLAN
PACKER POND DAM
SHEET C-1

Photo 1 - Upstream slope from left end of dam. Gate structure at left side of photo (Nov.1980).

Photo 2 - Erosion at center of upstream slope (Nov. 1980).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Packers Pond Dam Mill Brook Plainfield, Conn. CE#27785Ki
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	DATE Dec. 1980 PAGE C-1

Photo 3 - Top of dam from left abutment. Railway embankment runs parallel to dam (Nov. 1980).

Photo 4 - Top of dam from spillway and looking toward left end of dam (Nov. 1980).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Packers Pond Dam Mill Brook Plainfield, Conn. CE# 27785KF
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	DATE Dec. 1980 PAGE C-2

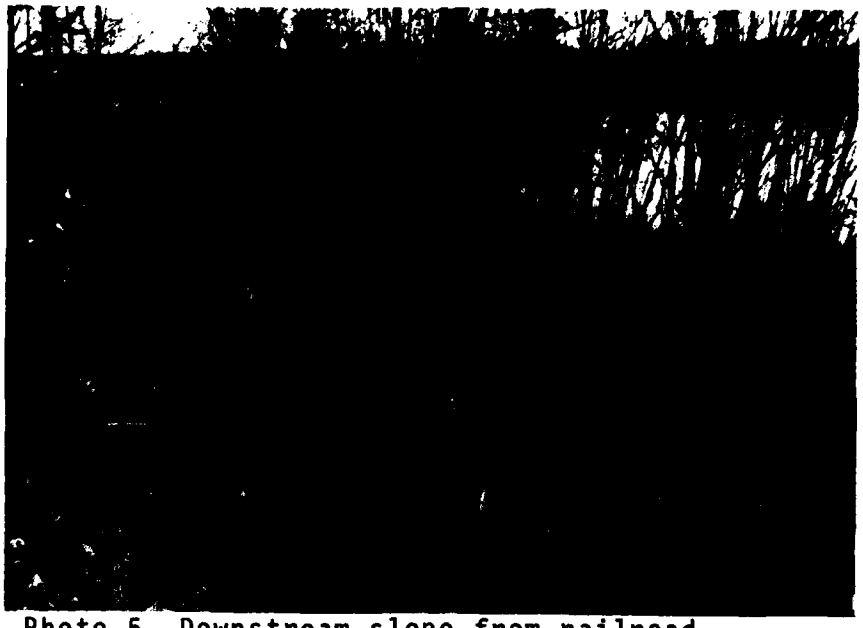


Photo 5 -Downstream slope from railroad embankment. Spillway at left side of photo(Nov.1980).

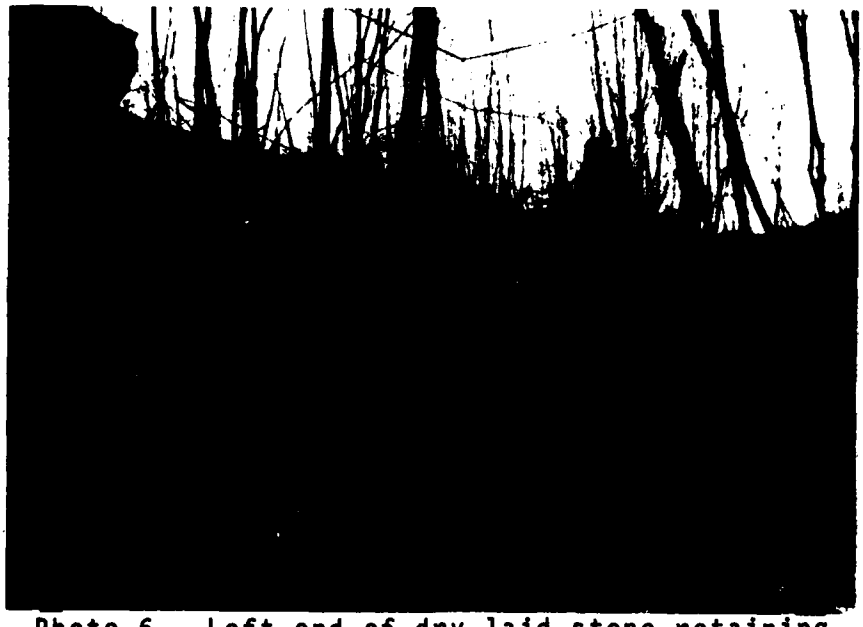


Photo 6 - Left end of dry-laid stone retaining wall along downstream slope (Nov. 1980).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Packers Pond Dam Mill Brook Plainfield, Conn.
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	CE# 27785 KF DATE Dec. 1980 PAGE C-3

Photo 7 - Spillway crest from left spillway wall (Nov. 1980).

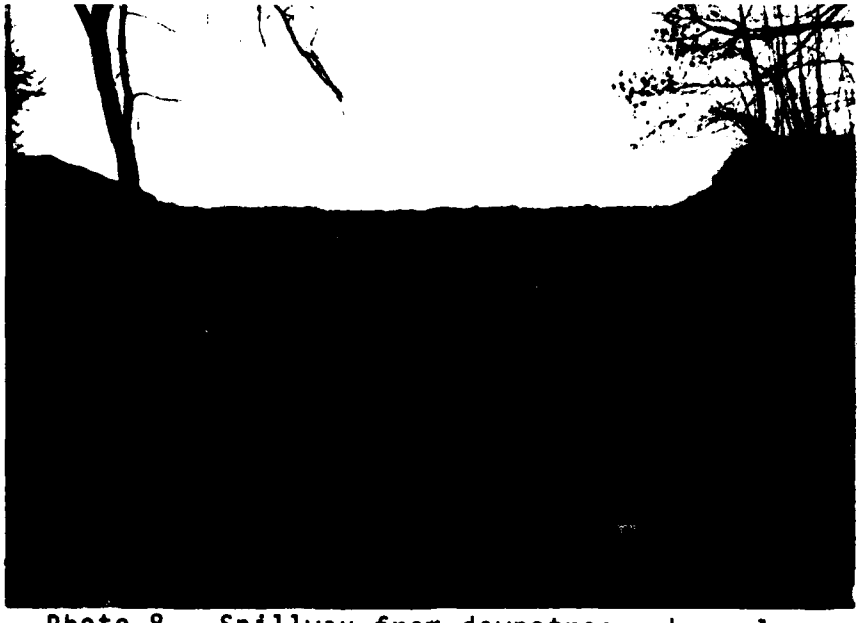


Photo 8 - Spillway from downstream channel (Nov. 1980).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Packers Pond Dam Mill Brook Plainfield, Conn. CE# 27785 KF
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	DATE Dec. 1980 PAGE C-4

Photo 9 - Gate structure and channel to railroad embankment from toe of railroad embankment (Nov. 1980).

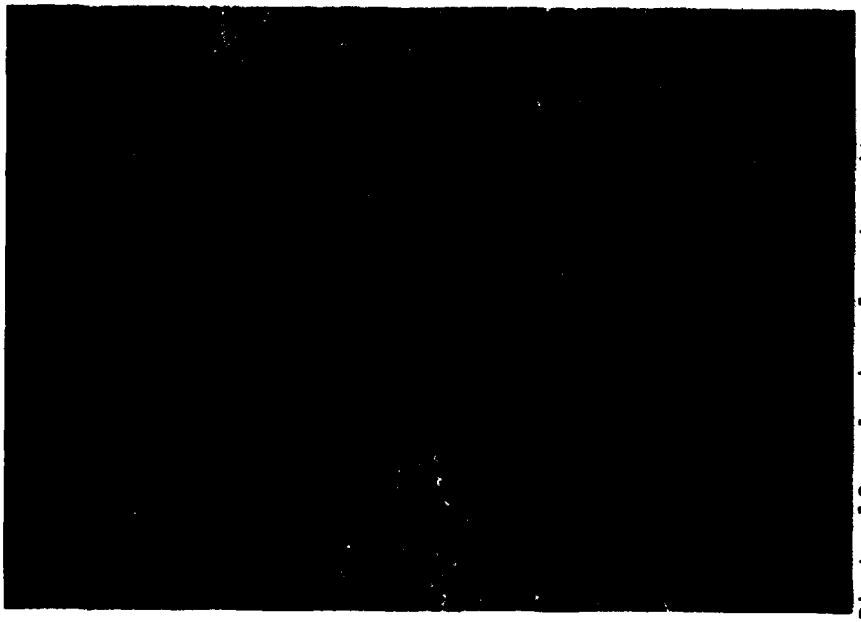


Photo 10 - Arch culvert under railroad embankment and outlet channel from gate structure (Nov. 1980).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS. CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Packers Pond Dam Mill Brook Plainfield, Conn. CE# 27785 KF DATE Dec. 1980 PAGE C-5

Photo 11 - Canal carrying flow from culvert under railroad embankment. Small dike runs along right side of canal (Nov. 1980).

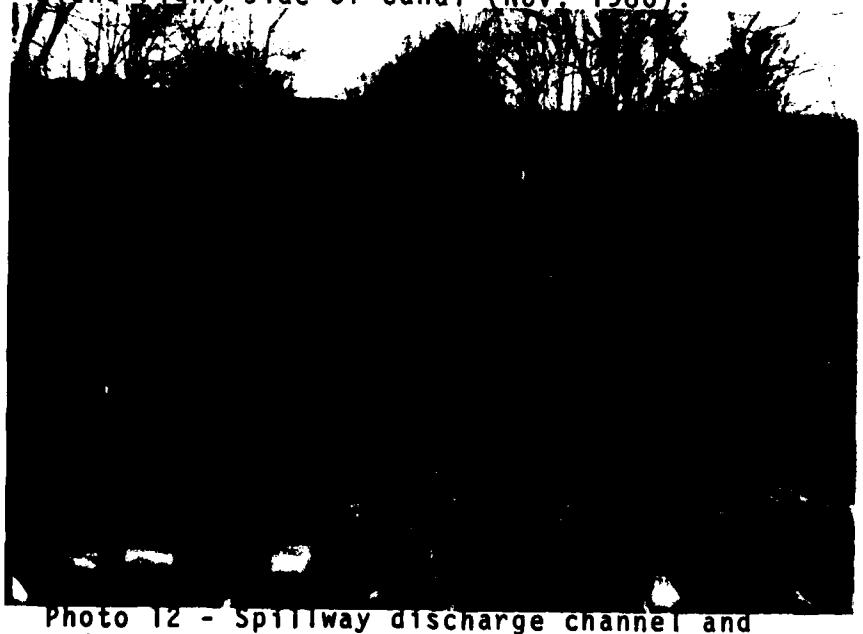
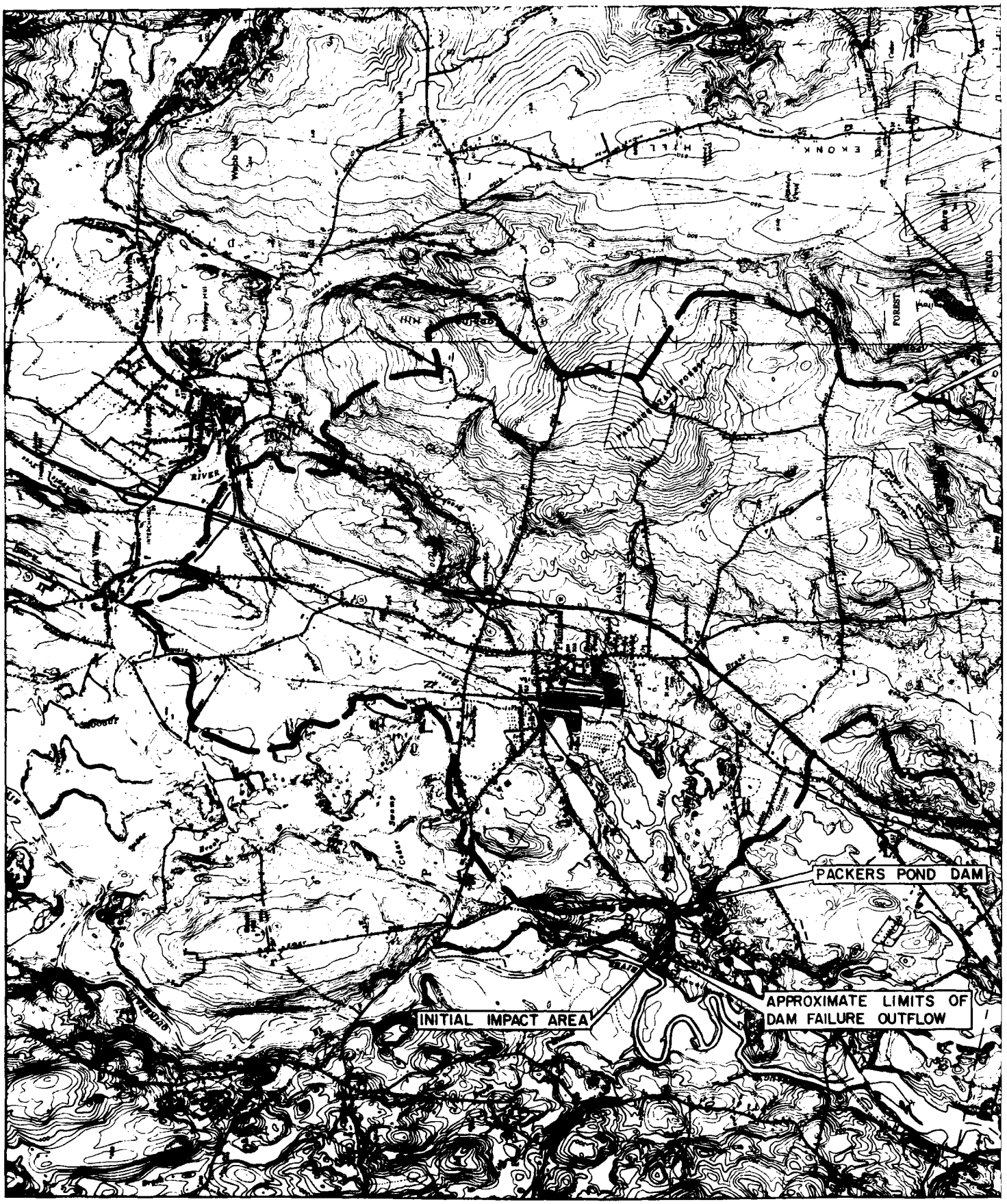


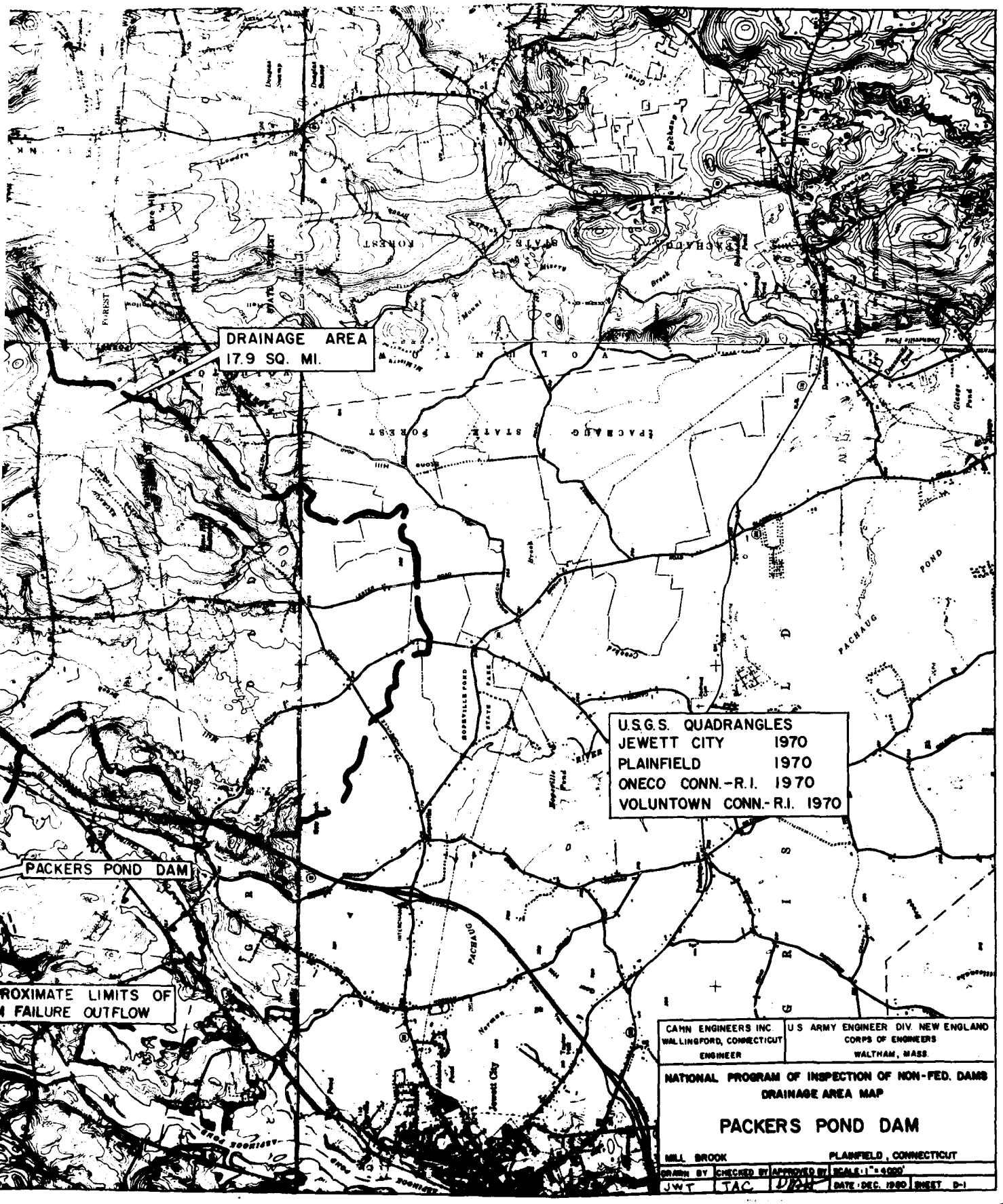
Photo 12 - Spillway discharge channel and railroad trestle from spillway creat (Nov.1980).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Packers Pond Dam Mill Brook Plainfield, Conn.
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	CE# 27785 KF DATE Dec. 1980 PAGE C-6

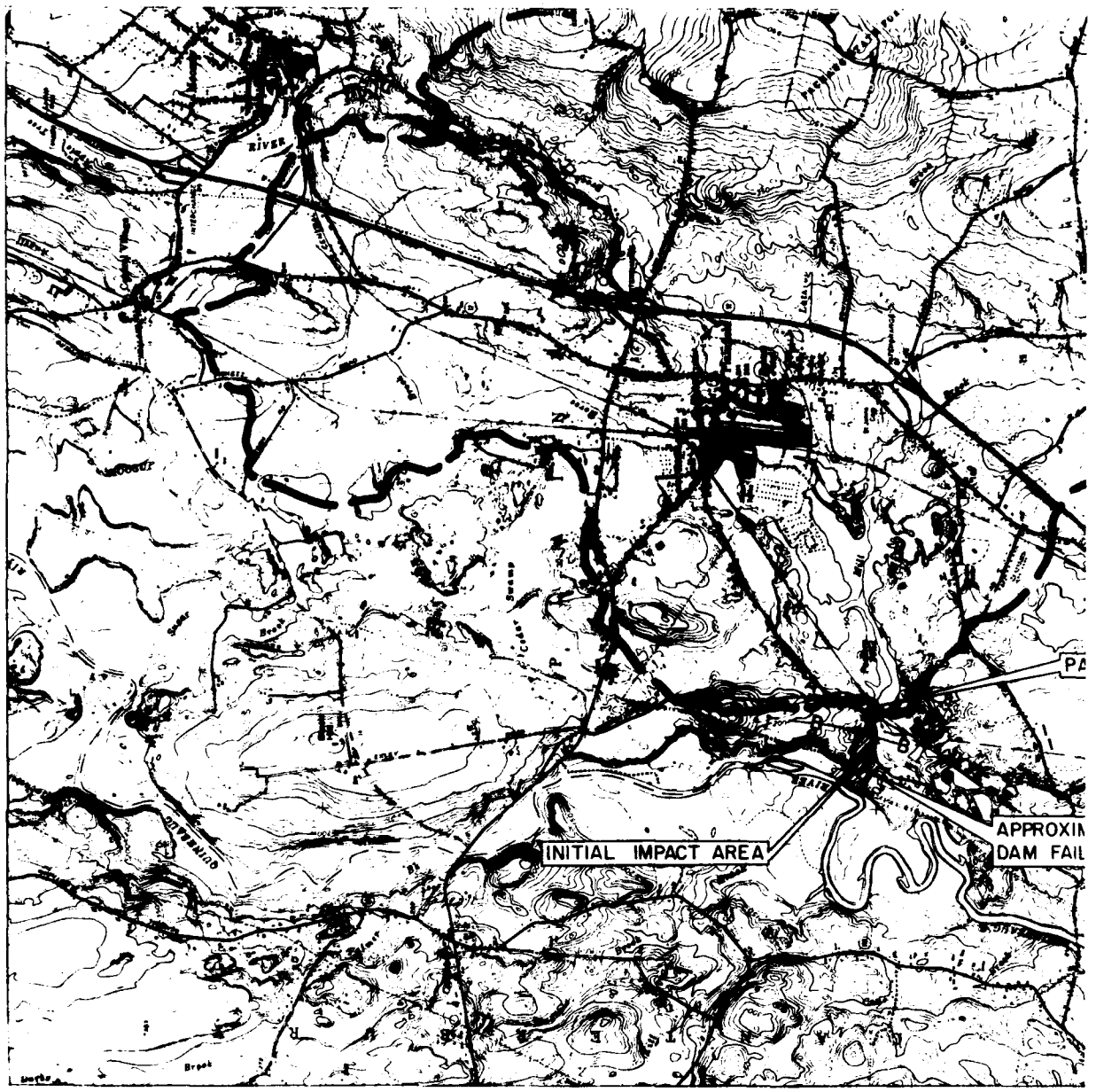
APPENDIX D

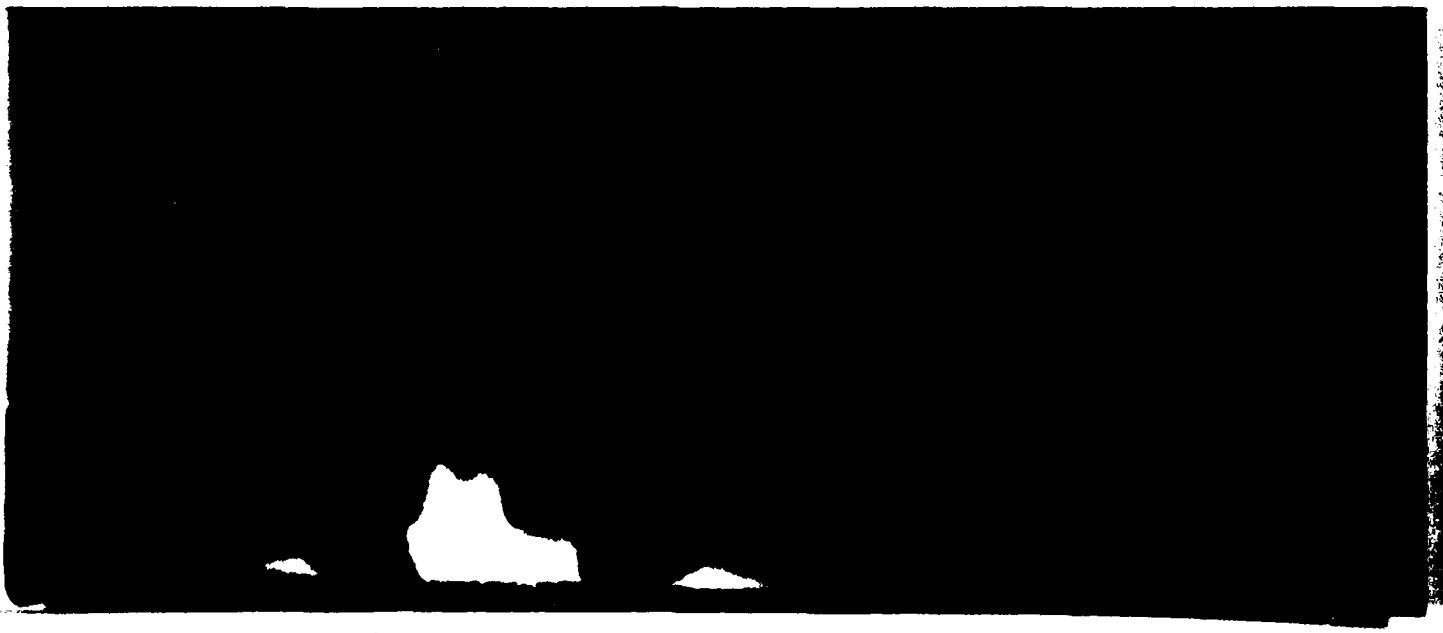
HYDRAULICS/HYDROLOGIC COMPUTATIONS

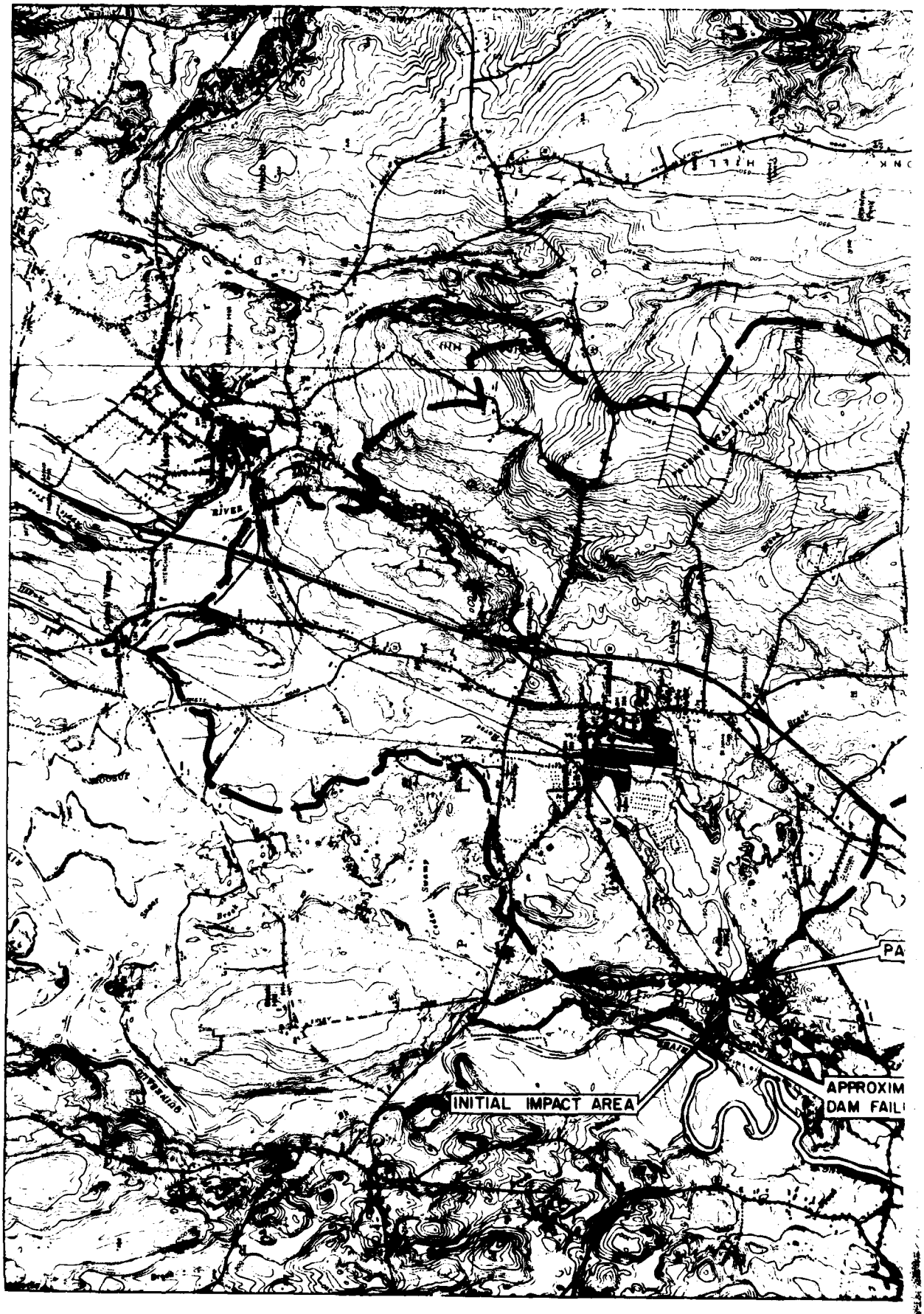

PACKERS POND DAM
APPROXIMATE LIMITS OF DAM FAILURE OUTFLOW
INITIAL IMPACT AREA

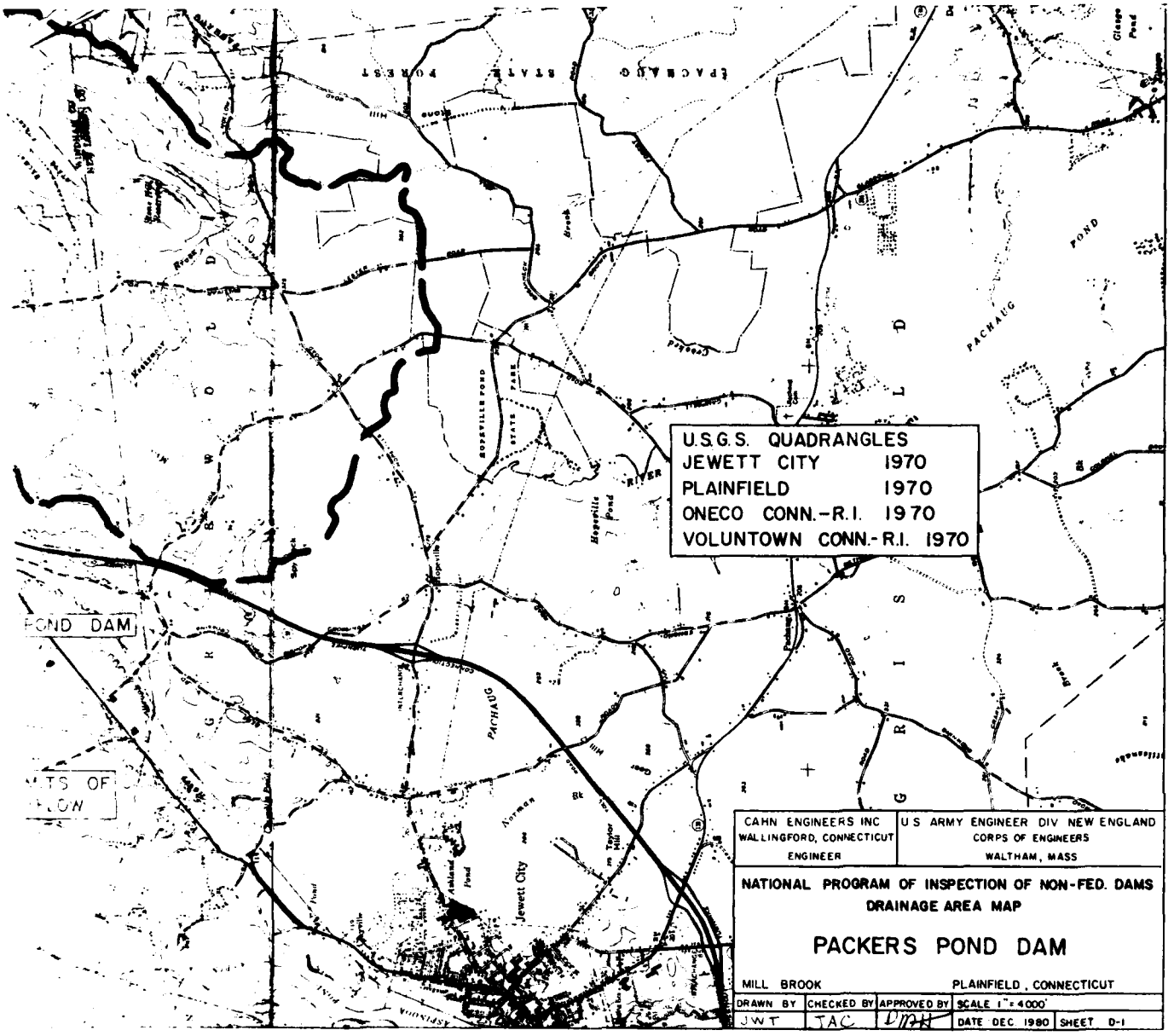

DRAINAGE AREA
17.9 SQ. MI.
PACKERS POND DAM
ROXIMATE LIMITS OF
FAILURE OUTFLOW
U.S.G.S. QUADRANGLES
JEWETT CITY 1970
PLAINFIELD 1970
ONECO CONN.-R.I. 1970
VOLUNTOWN CONN.-R.I. 1970
CAHN ENGINEERS INC.
WALLINGFORD, CONNECTICUT
ENGINEER
U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS
DRAINAGE AREA MAP
PACKERS POND DAM
MILL BROOK
PLAINFIELD, CONNECTICUT
DRAWN BY
CHECKED BY
APPROVED BY
SCALE: 1" = 4000'
JWT
TAC
DATE: DEC. 1980
SHEET D-1

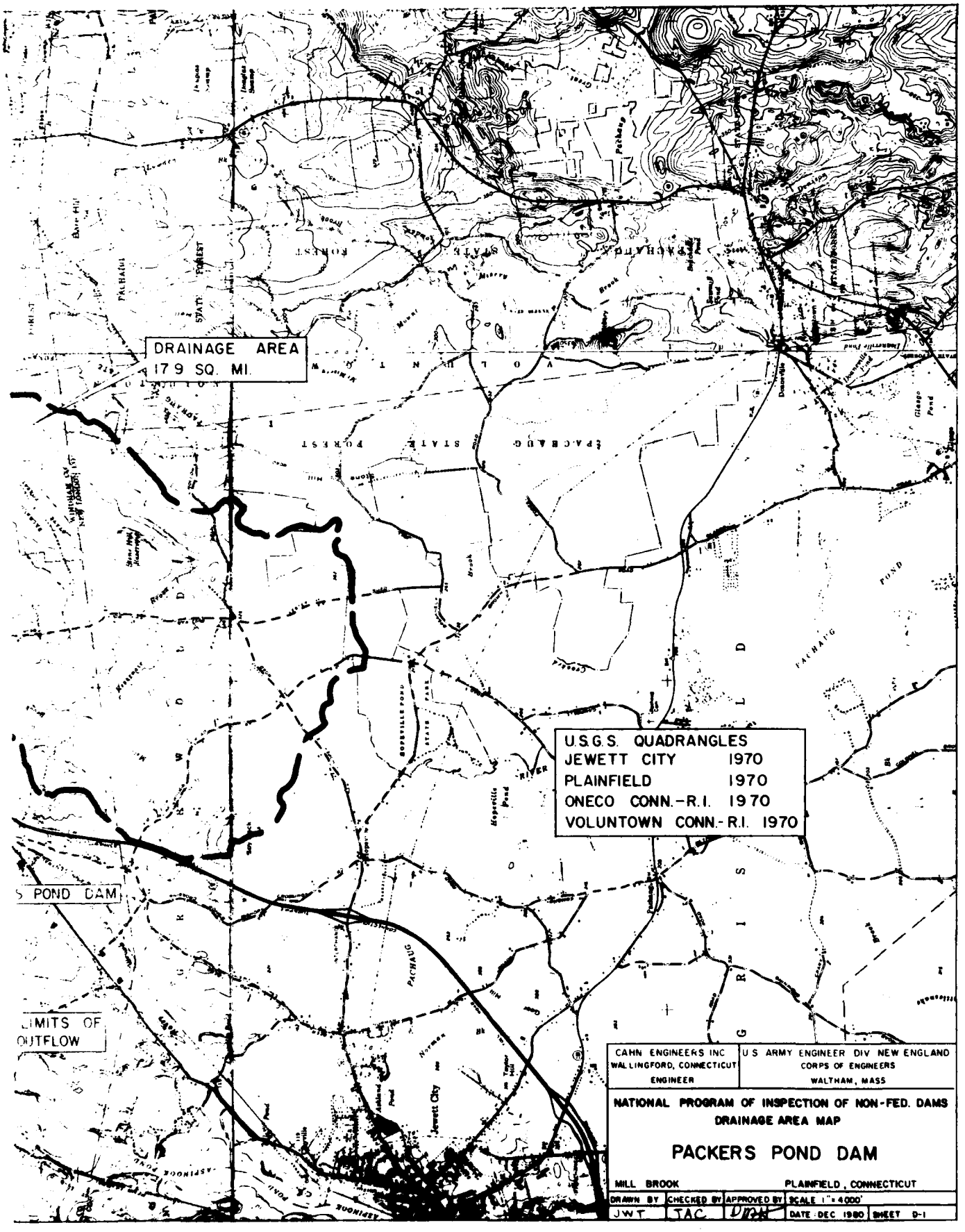
2


INITIAL IMPACT AREA
APPROXIM
DAM FAIL




INITIAL IMPACT AREA
APPROXIM
DAM FAIL


U.S.G.S. QUADRANGLES
JEWETT CITY 1970
PLAINFIELD 1970
ONECO CONN.-R.I. 1970
VOLUNTOWN CONN.-R.I. 1970
POND DAM
PACHAUG
Jewett City
CAHN ENGINEERS INC
WALLINGFORD, CONNECTICUT
ENGINEER
U S ARMY ENGINEER DIV NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS
DRAINAGE AREA MAP
PACKERS POND DAM
MILL BROOK
PLAINFIELD, CONNECTICUT
DRAWN BY
CHECKED BY
APPROVED BY
SCALE 1"=4000'
JWT
JAC
DATE DEC 1980
SHEET D-1



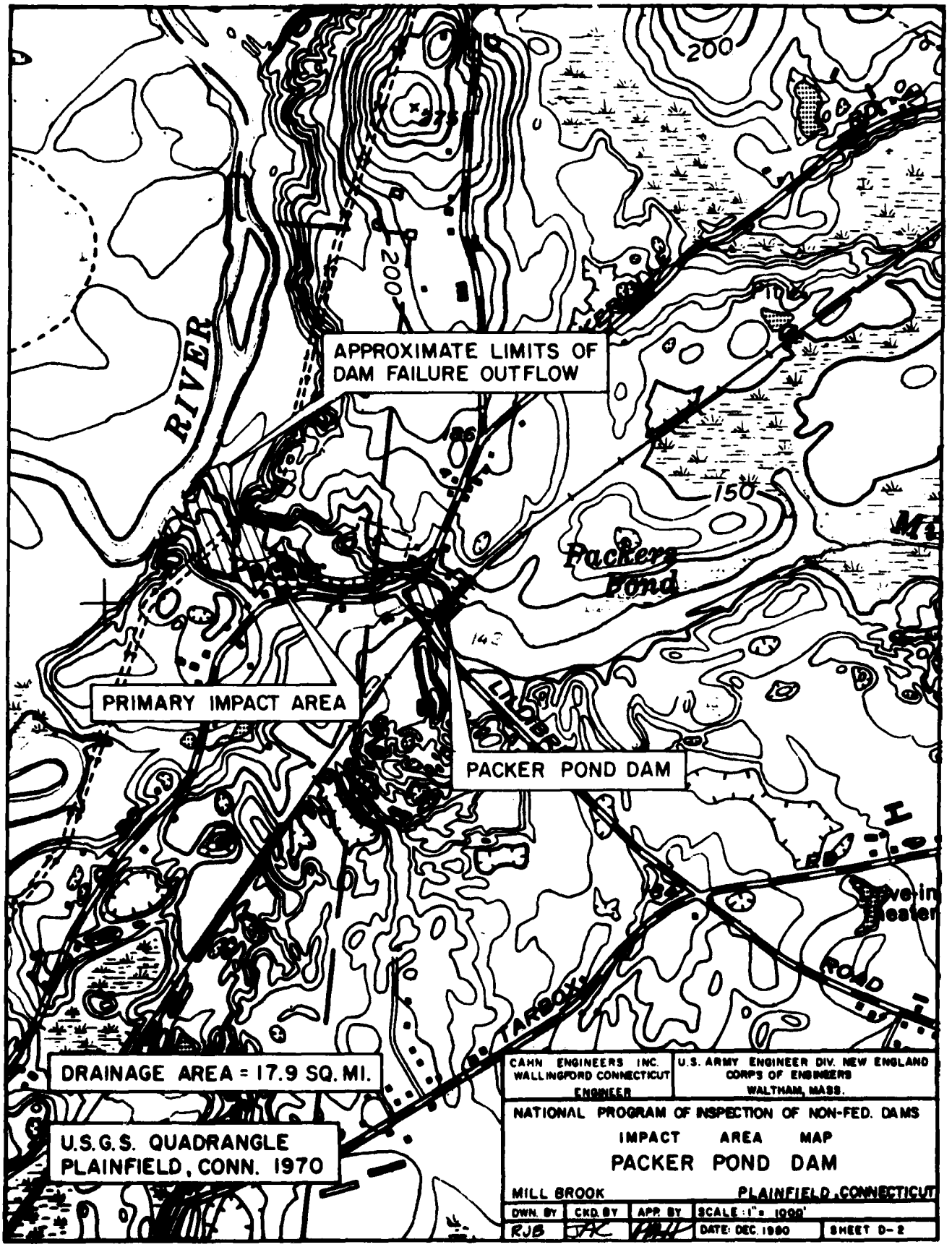
CAHN ENGINEERS INC WALLINGFORD, CONNECTICUT ENGINEER	U S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS
DRAINAGE AREA MAP

PACKERS POND DAM

MILL BROOK — PLAINFIELD, CONNECTICUT

DRAWN BY	CHECKED BY	APPROVED BY	SCALE 1" = 4000'	
JWT	TAC	DWH	DATE DEC 1980	SHEET D-1


APPROXIMATE LIMITS OF DAM FAILURE OUTFLOW
PRIMARY IMPACT AREA
PACKER POND DAM
DRAINAGE AREA = 17.9 SQ. MI.
U.S.G.S. QUADRANGLE PLAINFIELD, CONN. 1970
RIVER
Packers Pond
TARBOX
ROAD
200
150
CAHN ENGINEERS INC. WALLINGFORD CONNECTICUT ENGINEER
U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS
IMPACT AREA MAP
PACKER POND DAM
MILL BROOK
PLAINFIELD, CONNECTICUT
DWN. BY RJB
CKD. BY JK
APP. BY
SCALE: 1" = 1000'
DATE: DEC. 1980
SHEET D-2

DIVERSIFIED TECHNOLOGIES CORP. CONSULTING ENGINEERS NORTH HAVEN, CONN.

PROJECT NON FEDERAL DAM INSPECTION — PROJECT NO. 80-10-22 — SHEET 1 OF 20
NEW ENGLAND DIVISION — COMPUTED BY [illegible] — DATE 12/4/80
PACKERS POND DAM — CHECKED BY E. Butler Bell II — DATE 12/5/80

PERFORMANCE AT PEAK FLOOD CONDITIONS

PROBABLE MAXIMUM FLOOD (PMF) DETERMINATION

DRAINAGE AREA – 17.9 SQ. MILES FROM CONN. STATE DEP BULLETIN NO. 1, 1972 (GAZZATTEER OF NATURAL DRAINAGE AREAS, P-19)

WATERSHED CLASSIFICATION – "ROLLING" HIGHLY DEVELOPED IN THE CENTRAL PART, SOME SWAMPY LAND, AND REMAINDER MOSTLY WOODED BASED UPON USGS MAP AND SITE VISITS. THERE IS A DISCHARGE FROM A WATER POLLUTION CONTROL FACILITY WITHIN THE WATERSHED.

PMF PEAK INFLOW – FROM THE CORPS OF ENGINEERS DEC 1977 PEAK FLOW RATES GUIDE CURVES FOR A DRAINAGE AREA OF 17.9 SQ.M.
THE SELECTED INTENSITY = 1450 CFS/SQ. MILE FOR THE ABOVE DESCRIBED WATERSHED CLASSIFICATION

∴ PMF PEAK INFLOW = 1450 × 17.9 ≅ 26,000 CFS

SIZE CLASSIFICATION –
FOR THE PURPOSE OF DETERMINING PROJECT SIZE, THE MAXIMUM STORAGE ELEVATION IS CONSIDERED EQUAL TO THE TOP OF DAM.
TOP OF DAM = EL 146.4 *
TOE OF DAM @ SPILLWAY (DEEPEST) = EL 128.7
∴ HEIGHT OF DAM = 17.7 FT

* THE W.S. ELV. 142 MSL ON THE PLAINFIELD QUAD SHEET (1970) IS APPROX. ASSUMED TO BE THE SPILLWAY CREST ELV. ON NATIONAL GEODETIC VERTICAL DATUM (NGVD). ALL OTHER ELVS. ARE REFERENCED TO THIS ASSUMED ELV. AND ARE OBTAINED BASED UPON INFORMATION FURNISHED BY CAHN INC.

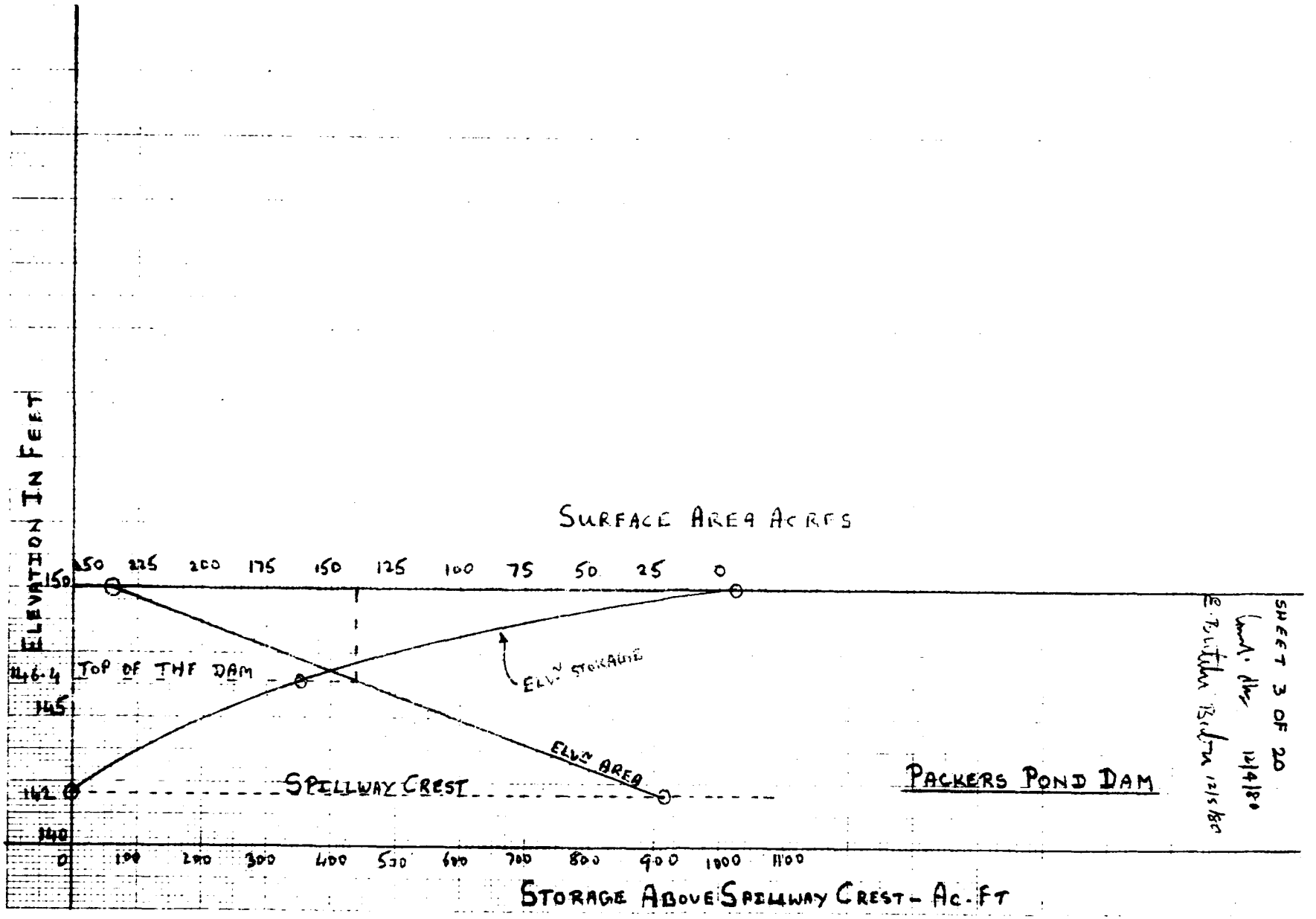
PLANIMETERING FROM USGS MAP FOR RESERVOIR SURFACE AREAS-
AT EL. 142 (SPILLWAY CREST) = 21 ACRES
AT EL. 150 = 235 ACRES

A STAGE RESERVOIR AREA CURVE IS PLOTTED (SHEET 3)
FROM THIS CURVE, RESERVOIR AREA AT TOP OF DAM = 140 ACRES
AVERAGE RESERVOIR AREA BETWEEN SPILLWAY CREST
AND TOP OF DAM = 80.5 AC
∴ STORAGE BETWEEN SPILLWAY CREST AND TOP
OF DAM = $4.4 \times 80.5 \cong 355$ AC.FT
ESTIMATED STORAGE BELOW SPILLWAY CREST = $\frac{1}{3}bh$
$= \frac{1}{3} \times 21 \times 13.3 \cong 95$ AC.FT

∴ MAXIMUM IMPOUNDMENT TO TOP OF DAM = 355 + 95
= 450 AC.FT.

A STAGE-STORAGE CURVE IS PLOTTED ON SHEET 3.

THUS. ACCORDING TO CORPS OF ENGINEERS GUIDELINES TABLE 1, THE PACKERS POND DAM IS CLASSIFIED SMALL BASED UPON THE STORAGE CAPACITY OF 450 AC.FT (< 1000 & ≥ 50), AND THE HEIGHT OF DAM IS ONLY 17.7'.


ELEVATION IN FEET
SURFACE AREA ACRES
250 225 200 175 150 125 100 75 50 25 0
150
146.4
TOP OF THE DAM
145
ELEV. STORAGE
ELEV. AREA
142
SPILLWAY CREST
140
0 100 200 300 400 500 600 700 800 900 1000 1100
STORAGE ABOVE SPILLWAY CREST - AC.-FT
PACKERS POND DAM
SHEET 3 OF 20
Lamont Dam 12/4/80
E. P. Litchfield 12/5/80
D-3

HAZARD POTENTIAL – SIGNIFICANT HAZARD POTENTIAL BASED UPON DAM BREACH ANALYSIS AND RELATIVE LOCATIONS OF HOUSES AND OTHER STRUCTURES. A DETAILED DISCUSSION OF FAILURE HAZARD POTENTIAL IS INCLUDED AT THE END OF BREACH ANALYSIS SECTION OF APPENDIX-D.

SELECTION OF TEST FLOOD –

FOR THE SMALL SIZE AND SIGNIFICANT HAZARD POTENTIAL CLASSIFICATION, TABLE 3 OF CORPS OF ENGINEERS RECOMMENDED GUIDELINES. THE TEST FLOOD COULD BE IN THE 100 YR TO 1/2 PMF RANGE.

BASED ON THE INVOLVED RISK POTENTIAL DOWN STREAM OF THE DAM, LOWER END OF THIS RANGE IS SELECTED.

TEST FLOOD = 100 YR.

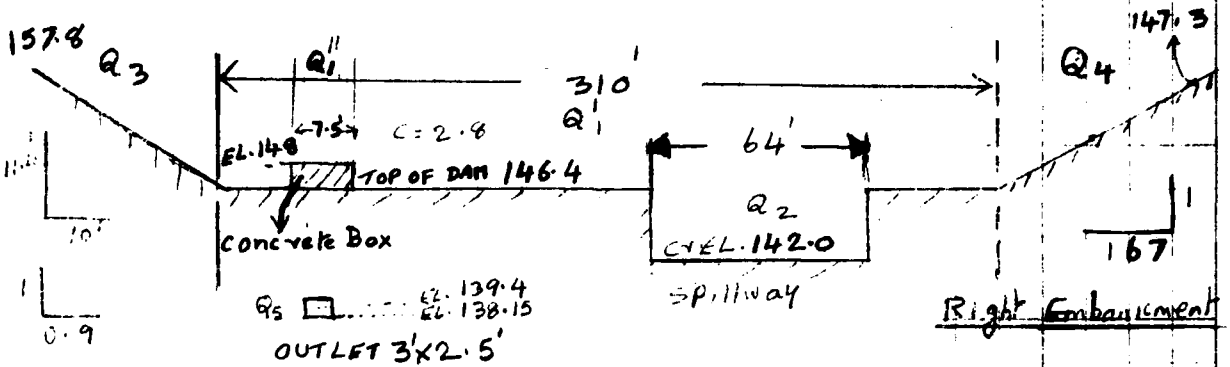
TEST FLOOD PEAK INFLOW = $\frac{5"}{19"} \times 26{,}000 \cong$ 6,800 CFS

NOTE: PMF OF 26,000 CFS WOULD RESULT FROM 19" RUN-OFF AND A 100 YEAR FLOOD IN CONNECTICUT WOULD RESULT FROM APPROXIMATELY 5" RUN-OFF WHICH MAY BE ON THE HIGH SIDE.

DIVERSIFIED TECHNOLOGIES CORP. CONSULTING ENGINEERS NORTH HAVEN, CONN.

PROJECT NON FEDERAL DAM INSPECTION — PROJECT NO. 80-10-22 — SHEET 5 OF 20
NEW ENGLAND DIVISION — COMPUTED BY [illegible] — DATE 12/5/80
PACKERS POND DAM — CHECKED BY E. Bichl[illegible] — DATE 12/6/80

COMPOSITE DISCHARGE RATING CURVE



APPROXIMATE POTENTIAL OVERFLOW PROFILE

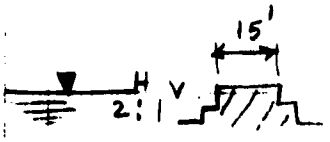
(SPILLWAY & DAM PROFILE BASED ON CAHN INC FIELD INFORMATION)

DAM — DAM LENGTH 310' − 64' = 246'
WIDTH OF CONCRETE BOX ON THE OUTLET = 7.5'
OVERFLOW LENGTH OF DAM = 238.5'
$Q_1' = CLH^{3/2}$ C = 2.8 (earthen, grass) CrELV^N = 146.4
$= 2.8 \times 238.5 \times H^{3/2} = \underline{667.8 H^{3/2}}$

FOR CONCRETE BOX SECTION $Q_1'' = CLH^{3/2}$
$= 3 \times 7.5 \times H^{3/2} = \underline{22.5 H^{3/2}}$ C = 3.0 ASSUMED
CrELV^N = 148.0

SPILLWAY

$Q_2 = CLH^{3/2}$



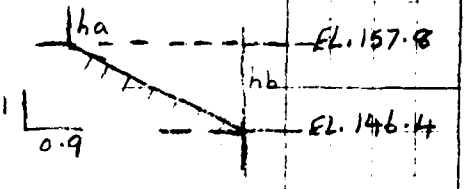
CrELV^N = 142.0
L = 64'
C = 2.9 (stone, uneven)
Per Fig 7 of Book 3, chapter A5 of "Measurements of Peak Discharge at Dams by Indirect Methods" by USGS 1968

$Q_2 = \underline{185.6} H^{3/2}$

D-5

LEFT EMBANKMENT

$$Q_3 = \frac{2}{3} \frac{CL\left(h_b^{5/2} - h_a^{5/2}\right)}{(h_b - h_a)} *$$



$C = 2.8$ ASSUMED (Earthen, Grass)

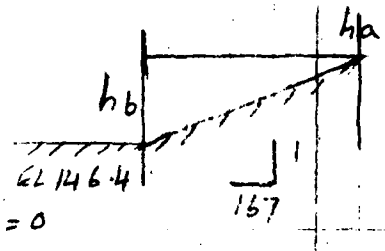
$h_a = 0$ upto EL. 157.8

$= 0.4 \times 2.8 \times 0.9\ h_b^{5/2}$

$= 1.01\ h_b^{5/2}$

RIGHT EMBANKMENT

$$Q_4 = \frac{2}{3} \frac{CL\left(h_b^{5/2} - h_a^{5/2}\right)}{(h_b - h_a)} *$$



$C = 2.8$ ASSUMED (Earth(en) $h_a = 0$

$= 0.4 \times 2.8 \times 167 \times h_b^{5/2}$

$= 187.04\ h_b^{5/2}$

OUTLET PIPE

THE SIZE OF THE OUTLET = 3' x 2.5' Per Cahn Inc. Field Information

$Q_5 = C \cdot A \sqrt{2gh}$

$= 60.2 \sqrt{h}$ NEGLECTING LOSSES

ELVN = 139.4 Center of outlet.

* USGS RECOMMENDED FORMULA FOR MORE PRECISE DISCHARGE OVER INCLINED DAM/EMBANKMENT CREST (REF: MEASUREMENT OF PEAK DISCHARGES AT DAM BY INDIRECT METHODS, USGS BOOK 3, CHAPTER A-5, PAGE 3-4, 1968)

PROJECT NON FEDERAL DAM INSPECTION — PROJECT NO. 80-10-22 — SHEET 7 OF 20
NEW ENGLAND DIVISION — COMPUTED BY [illegible] — DATE 12/5/80
PACKERS POND DAM — CHECKED BY E. Butch [illegible] — DATE 12/6/80

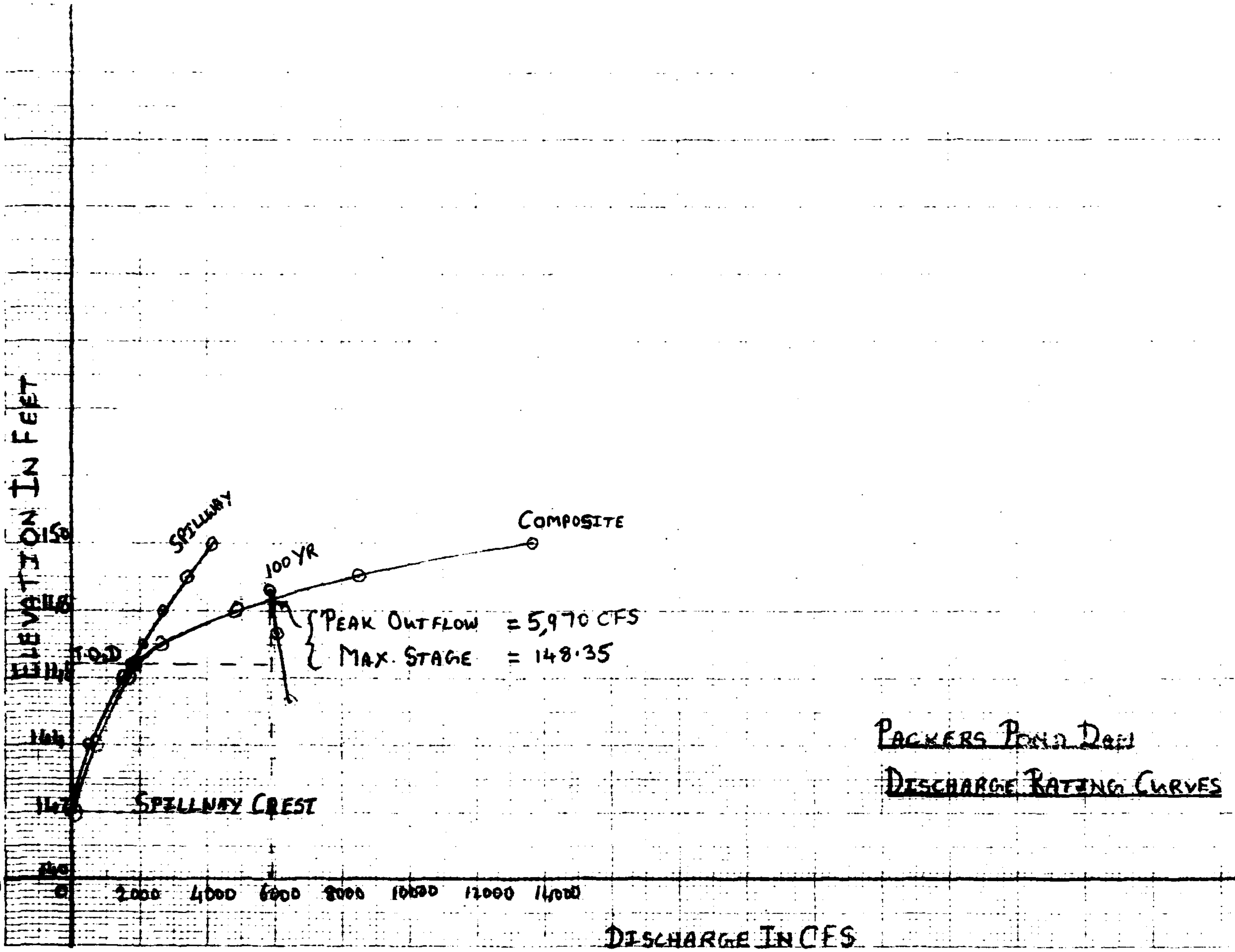
TABULATION OF DISCHARGE RATES (CFS)

	ELVN	Q_1' DAM	Q_1''	TOTAL DAM Q_1	S. WAY Q_2	L. EMB Q_3	R. EMB Q_4	Q_5	TOTAL Q
[illegible] CREEK	142	0	0	0	0	0	0	100	100
	144	0	0	0	520	0	0	130	650
	146	0	0	0	1500	0	0	150	1650
TOP OF THE DAM →	146.4	0	0	0	1700	0	0	160	1860
	147	310	0	310	2100	0.3	50	165	2625
TESTFLOOD	148	1350	0	1350	2700	4	606	175	4835
= 100 YR →	148.35	1818	5	1823	2970	5	992	180	5970
	149	2800	20	2820	3400	10	2035	185	8450
	150	4550	60	4610	4200	25	4600	195	13,630

DISCHARGE RATING CURVES FOR TOTAL Q (COMPOSITE) AND SPILLWAY ARE SHOWN ON SHEET 8

Chkd. [illegible] 12/5/80
E. Butchi Babu 12/6/80

PACKERS POND DAM
DISCHARGE RATING CURVES



DETERMINATION OF PEAK OUTFLOW —

BY USING THE CORPS OF ENGINEERS "SURCHARGE STORAGE ROUTING" ALTERNATE METHOD:
FOR 6,800 CFS (100YR) THE DISCHARGE RATING CURVE GIVES ELVN = 148.6 AND FROM STAGE STORAGE CURVE FOR THIS ELVN; STORAGE = 670 AC·FT.

$$STOR_i = \frac{670 \times 12}{17.9 \times 640} = 0.70''$$ OF RUN-OFF

$$Q_{P_i} = Q_{P_1}\left(1 - \frac{STOR_i}{5}\right)$$

① STOR$_i$ - INCHES	② $\left(1 - \frac{STOR_i}{5}\right)$	③ STOR$_i$ AC·FT ① $\times \frac{17.9 \times 640}{12}$	④ Q_{P_i} CFS ② $\times$ 6,800	⑤ ELVN FROM STORAGE CURVE USING ③
0.25	0.95	240	6,460	145.3
0.5	0.90	475	6,120	147.37
0.7	0.86	670	5,850	148.6

COLUMNS ④ & ⑤ ARE PLOTTED ON DISCHARGE RATING CURVE AND

100YR PEAK OUTFLOW Q = 5,970 CFS

MAXIMUM STAGE = 148.35 NGVD
TOP OF DAM = 146.4 NGVD

∴ THE DAM IS EXPECTED TO OVERTOP BY 1.95, SAY 2 FT.

BREACH ANALYSIS — DOWN STREAM FAILURE HAZARD

BREACH OUTFLOW $Q_b = \frac{8}{27} \times W_b \times \sqrt{g} \times Y_o^{3/2}$ BASED ON CORPS OF ENGINEERS "RULE OF THUMB" GUIDANCE FOR ESTIMATING D/S DAM FAILURE HYDROGRAPHS.

WATER DEPTH AT TIME OF FAILURE $Y_o = 17.7'$ WITH POOL AT TOP OF DAM

ESTIMATED BREACH WIDTH W_b = 40% OF MID-HEIGHT LENGTH OF DAM
= 40% OF 165' = 66'
(MID-HEIGHT LENGTH FROM CAHN INC'S FIELD INFORMATION)

$Q_b = \frac{8}{27} \times 66 \times \sqrt{32.2} \times (17.7)^{3/2} = 8,300$ CFS

PEAK FAILURE OUTFLOW (Q_{P_1}) = Q_b + DISCHARGE FROM OUTLET
= 8300 + 160 ≅ 8,500 CFS

(IT IS PRESUMED THAT SPILLWAY IS PART OF THE BREACH WIDTH)

ESTIMATED FAILURE FLOOD DEPTH IMMEDIATELY D/S FROM DAM ≅ 0.44 Y_o = 0.44 × 17.7 ≅ 8 FT.

PERFORM DOWNSTREAM ROUTING OF PEAK FAILURE OUTFLOW

SELECT A SECTION AA 375' DOWN STREAM OF THE DAM AND JUST ABOVE THE PACKERVILLE ROAD CULVERT

USING MANNING'S EQUATION

$Q = \frac{1.486}{n} \times A \times R^{2/3} \times S^{1/2}$

$= 2.2 \times A \times R^{2/3}$

n = 0.06 ASSUMED (FAIRLY FLAT)

SLOPE S = 0.008 ESTIMATED FROM USGS MAP

ELVN	A SQ. FT	P	R = A/P	$R^{2/3}$	Q CFS
127	0	—	—	—	—
130	112	75	1.49	1.3	320
135	770	188	4.09	2.6	4400
140	1990	300	6.63	3.5	15,300

STAGE AREA AND STAGE DISCHARGE CURVES ARE PLOTTED FOR SECTION AA.

FOR PEAK FAILURE OUTFLOW QP_1 = 8,500 CFS
ELVN = 137.37 FROM STAGE-DISCHARGE CURVE
AND STAGE AREA CURVE GIVES AREA ≅ 1272 SQ. FT.

VOLUME OF REACH $V_1 = \frac{375 \times 1272}{43,560} \cong 11$ AC. FT.

TRIAL $QP_2 = QP_1 \left(1 - \frac{V_1}{S}\right)$ WHERE S = TOTAL STORAGE TO TOP OF DAM $= 8,500 \left(1 - \frac{11}{450}\right) \cong 8,300$ CFS.

FOR THIS QP_2 THE STAGE-DISCHARGE CURVE
GIVES ELVN = 137.25
AND AREA ≅ 1236 SQ FT

$\therefore V_2 = \frac{375 \times 1236}{43.560} = 11$ AC. FT.

RECOMPUTING QP_2 ≅ 8,300 CFS

FLOOD STAGE AT SECTION AA ≅ 137.25

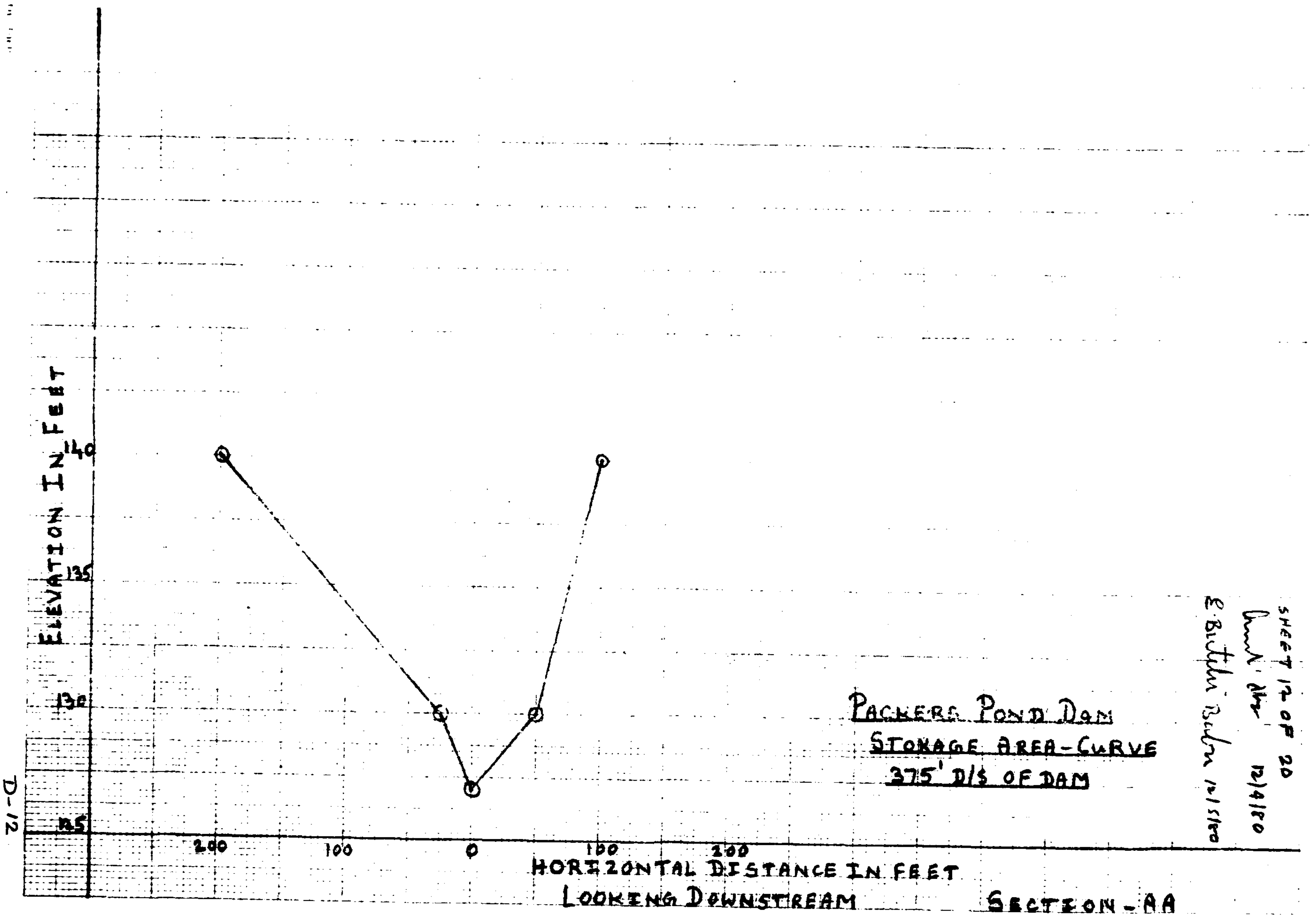
FLOOD DEPTH AT SECTION AA = EL. 137.25 − EL 127
≅ 10.3 FT.

AND VELOCITY AT SECTION AA $= \frac{8,300}{1236} \cong$ 7 FPS

12/4/80

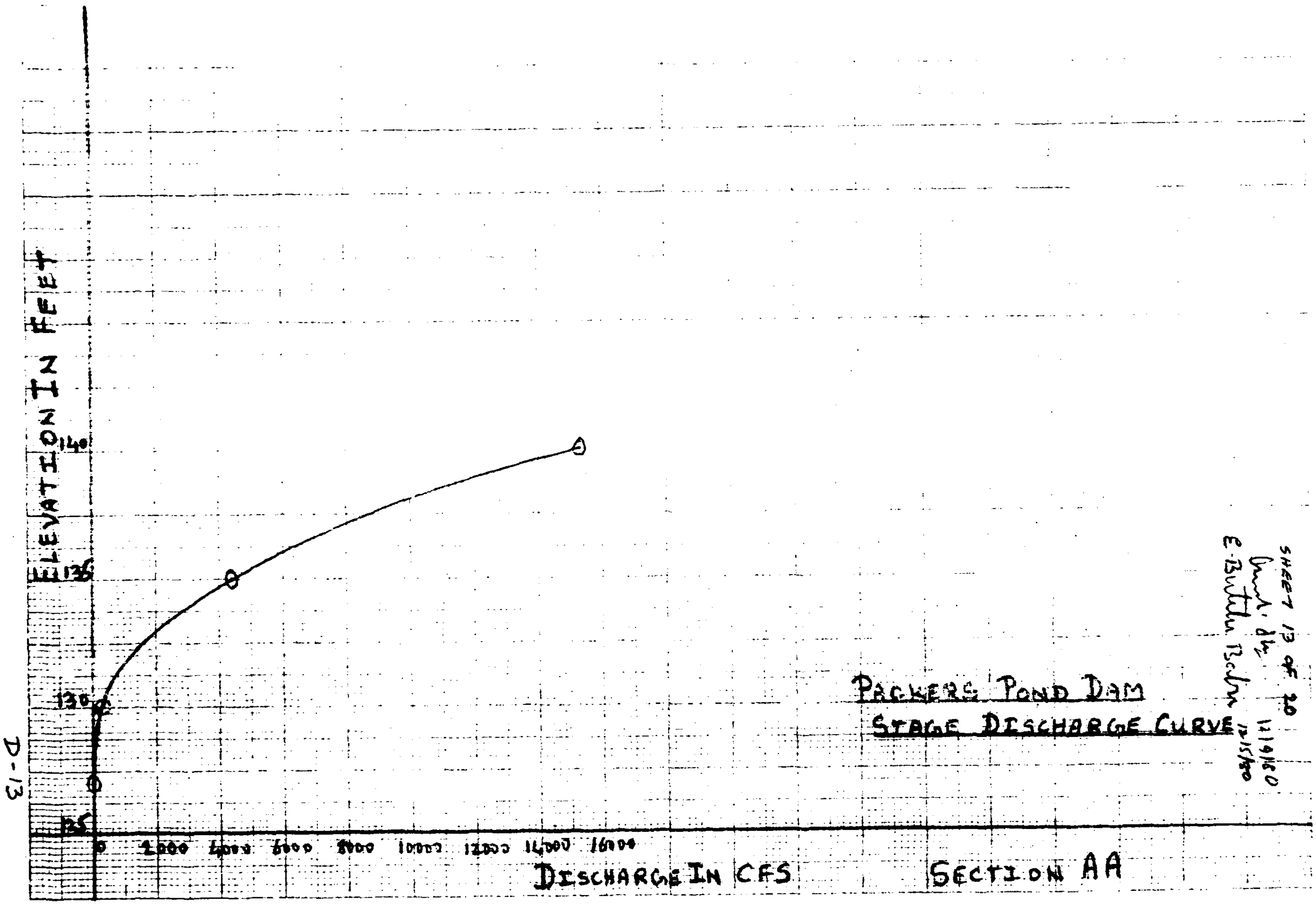
12/5/80

PACKERS POND DAM
STORAGE AREA-CURVE
375' D/S OF DAM



SECTION - AA

SHEET 13 OF 20

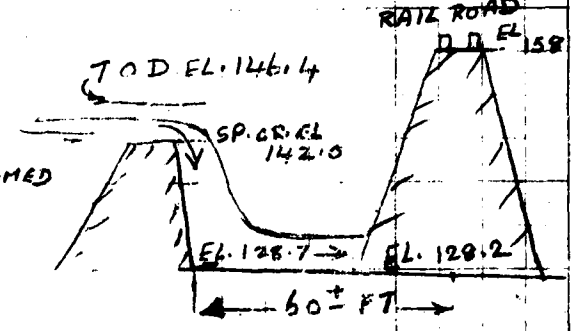


PACKERS POND DAM
STAGE DISCHARGE CURVE

SECTION AA

ROUTING OF DAM FAILURE FLOW THROUGH RAILROAD TRESTLE OPENING:

WIDTH OF OPENING = 45FT
ESTIMATED SLOPE OF THE CHANNEL S = 0.008
n = 0.06 ASSUMED



USING MANNING'S EQUATION

$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

$$= 2.2 A R^{2/3}$$

DEPTH OF FLOW FT.	ELVN	A SQ. FT	P	R	$R^{2/3}$	Q CFS
8	136.2	360	61	5.90	3.27	2605
10	138.2	450	65	6.92	3.63	3623
12	140.2	540	69	7.83	3.94	4718
14	142.2	630	73	8.63	4.21	5875
16	144.2	720	77	9.35	4.44	7084
18	146.2	810	81	10.00	4.64	8334
19	147.2	855	83	10.30	4.74	8973

THE RATING CURVE FOR THE OPENING IS PLOTTED AND FOR A DAM FAILURE OUTFLOW OF 8300CFS, FLOOD STAGE FROM THIS CURVE = 146.0
THIS FLOOD ELEVATION IS 12 FT BELOW THE TOP OF THE TRESTLE AND THE OPENING HAS ADEQUATE CAPACITY TO PASS THE DAM FAILURE OUTFLOW.

AD-A144 844 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS 2/2
PACKERS POND DAM (CT..(U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV DEC 80

UNCLASSIFIED F/G 13/13 NL

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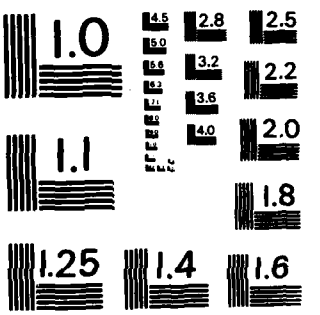
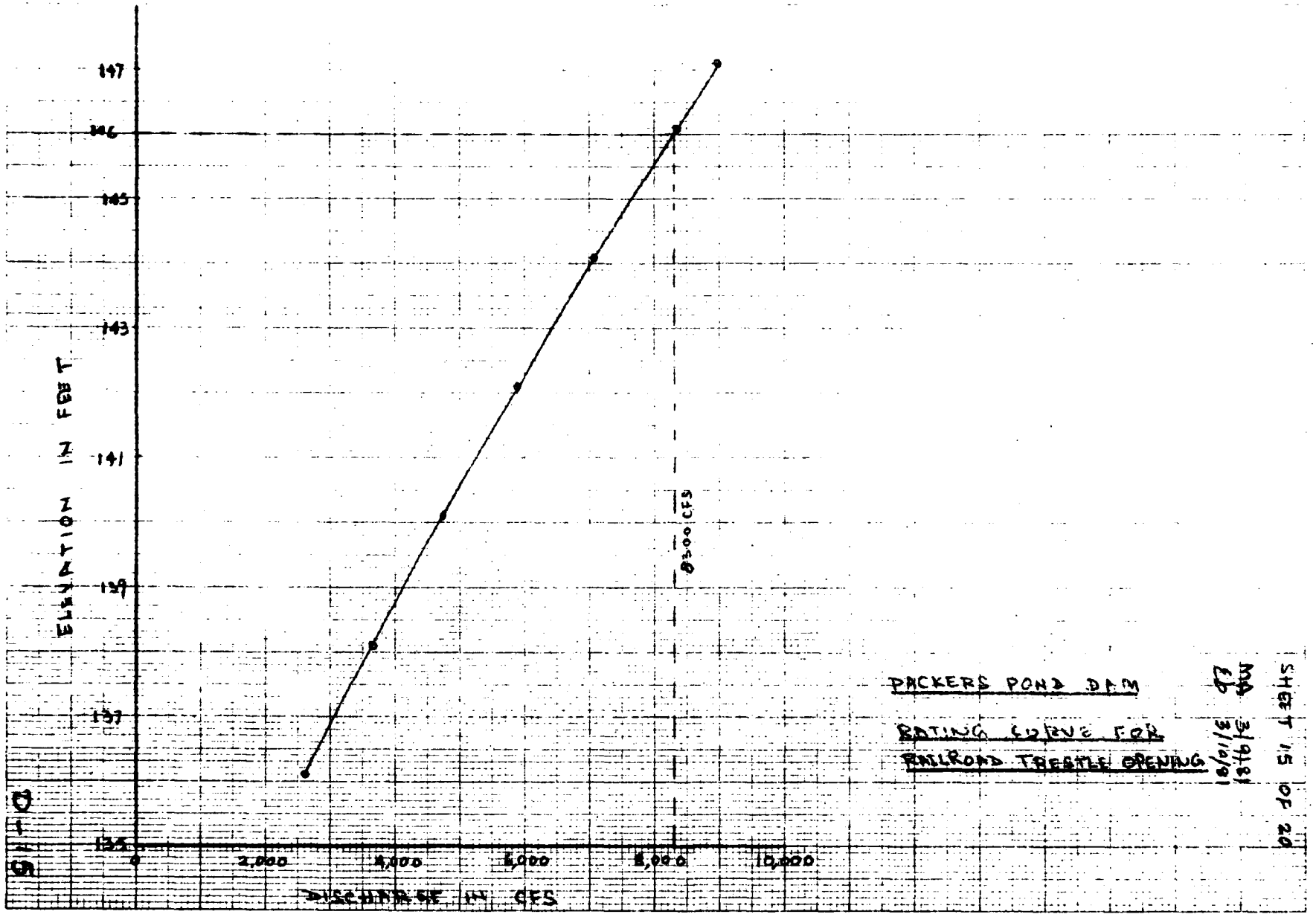


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



PACKERS POND DAM

RATING CURVE FOR
RAILROAD TRESTLE OPENING

SHEET 15 OF 20

MM 3/19/81

SELECT A SECTION BB 650' D/S OF SECTION AA

THIS COMPUTATION IS MADE TO ESTIMATE THE DEPTH OF FLOOD WATER IN THE VICINITY OF A RESIDENCE LOCATED ADJACENT TO THE BROOK USING MANNING'S EQUATION

$Q = \frac{1.486}{n} \times A \times R^{2/3} \times S^{\frac{1}{2}}$ $n = 0.06$ ASSUMED

$= 3.2 \times A \times R^{2/3}$ slope $S = 0.017$ ESTIMATED FROM USGS MAP

ELV^N	Sq FT	P	R = A/P	$R^{2/3}$	Q CFS
116	0	—	—	—	—
120	150	75	2.00	1.6	750
125	712	150	4.75	2.8	6,400
130	1650	225	7.33	3.8	20,100

STAGE AREA AND STAGE DISCHARGE CURVES ARE PLOTTED FOR $QP_1 = 8,300$ CFS. ELV^N = 126 AND FROM STAGE-AREA CURVE, AREA = 870 SQ. FT

VOLUME OF REACH $V_1 = \frac{650 \times 870}{43,560} \cong 13$ AC. FT

STORAGE REMAINING = 450 − 11 ≅ 439 AC. FT

TRIAL $QP_2 = QP_1 \left(1 - \frac{V_1}{S}\right)$

$= 8300 \left(1 - \frac{13}{439}\right) \cong 8,000$ CFS

FOR 8,000 CFS, ELVN = 125.75 AND AREA = 825 SQ FT

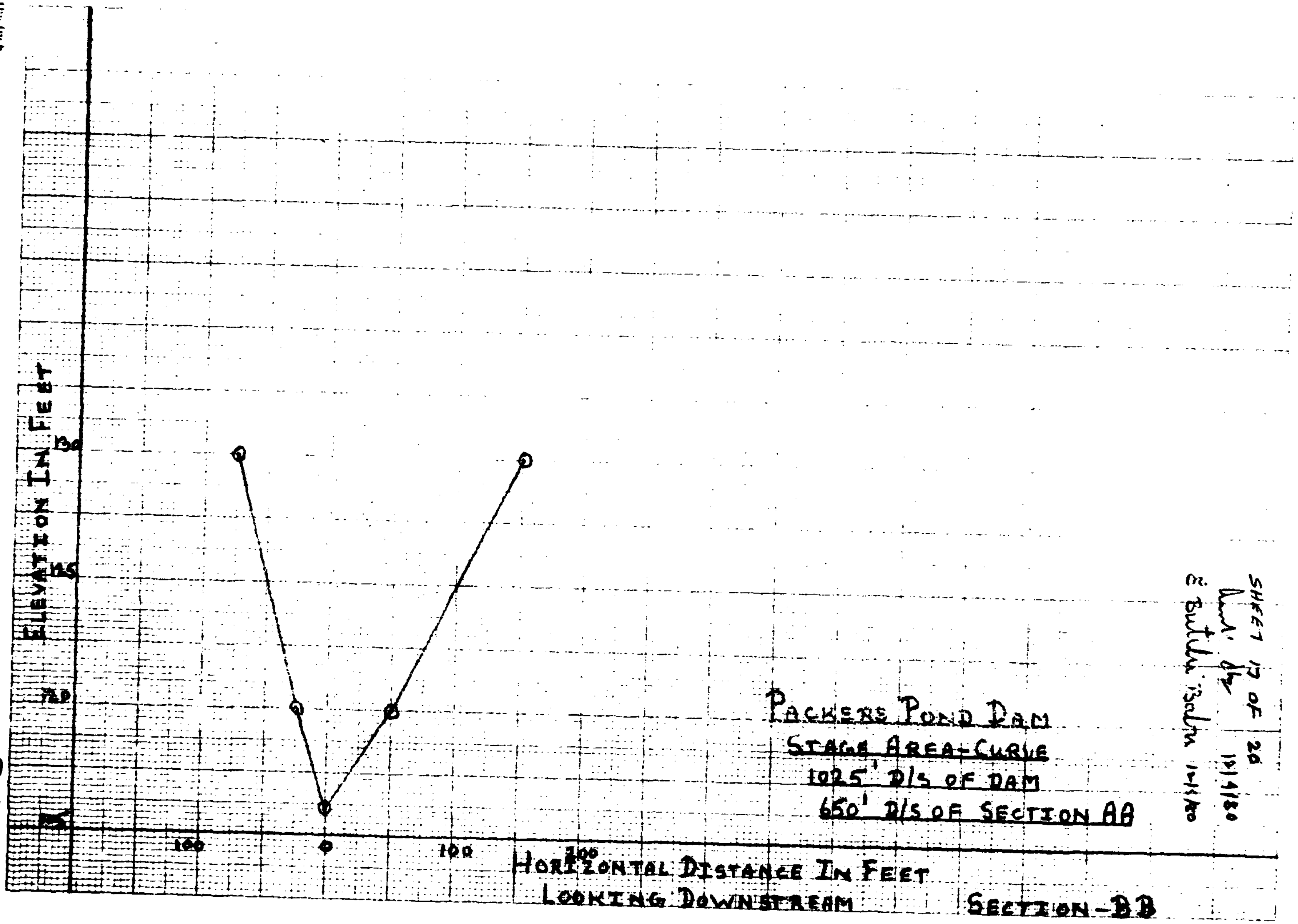
$V_2 = \frac{650 \times 825}{43,560} \cong 12$ AC. FT

RECOMPUTING $QP_2 = 8,300 \left(1 - \frac{13+12}{439}\right) = 8,100$ CFS

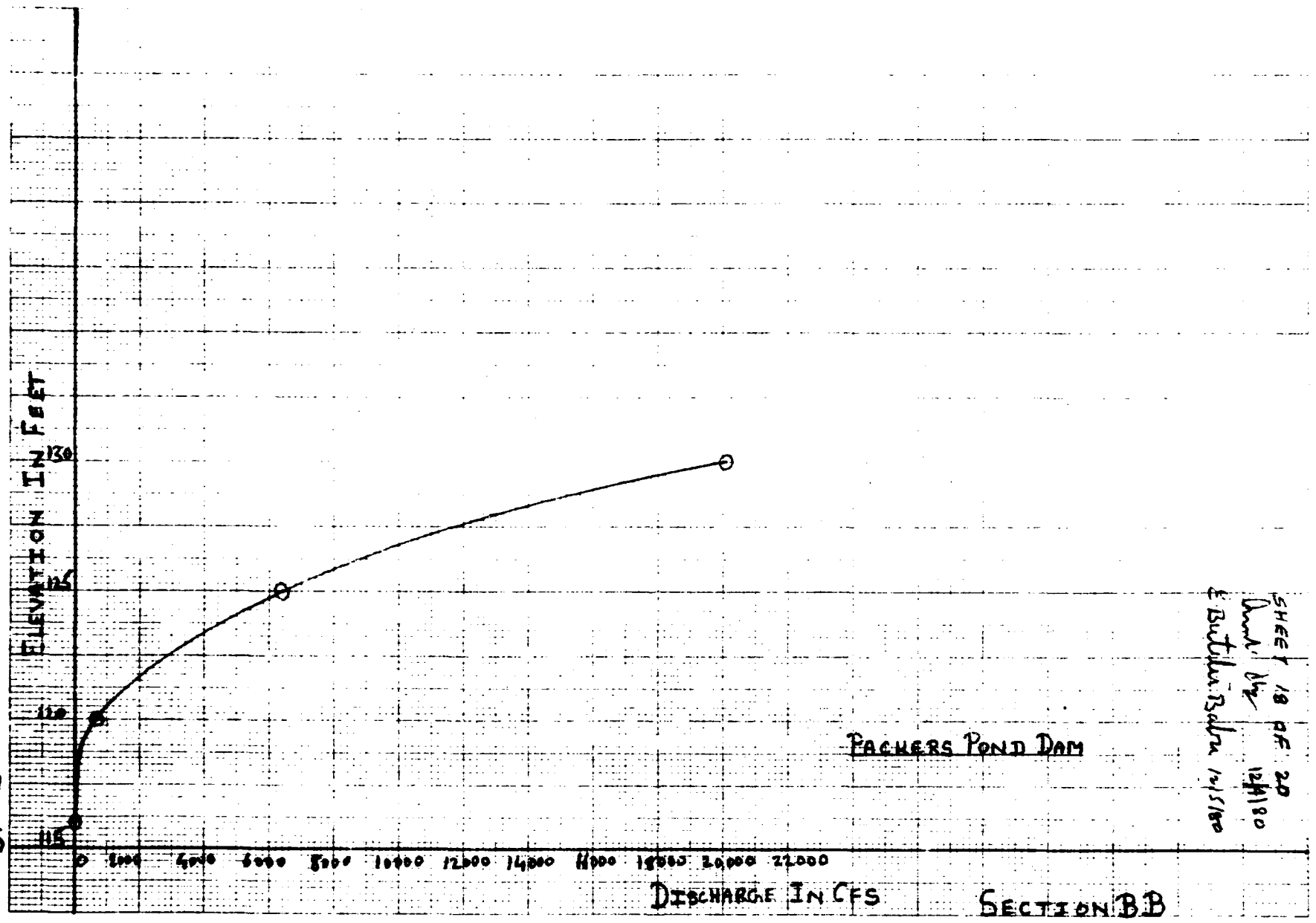
FLOOD STAGE ≅ 125.9

DEPTH OF FLOOD WATER = EL. 125.9 − EL. 116 ≅ 10 FT.

VELOCITY AT SECTION BB $= \frac{8,100}{845} \cong 9.5$ FPS



PACKERS POND DAM
STAGE AREA-CURVE
1025' D/S OF DAM
650' D/S OF SECTION AA



PACKERS POND DAM

SECTION BB

SHEET 18 OF 20
Dwn. by
12/1/80
& Butler-Balka 12/1/80

D-18

NOTE: ROUTING WAS ALSO PERFORMED KEEPING STORAGE VOLUME (S) CONSTANT. THE RESULTING FLOOD STAGE & DEPTH VALUES OBTAINED ARE NEARLY THE SAME.

FAILURE HAZARD POTENTIAL: SUMMARY OF BREACH ANALYSES

LOCATION	DISTANCE FROM DAM FT	PEAK FLOW RATE CFS	FLOOD STAGE	FLOOD DEPTH FT	VELOCITY FPS
DAM	0	8500	136.7	8	—
A A	375	8300	137.25	10.3	7
B B	1025	8100	125.9	10	9.5

IT IS PRESUMED THAT THE BREACH WOULD OCCUR IN THE VICINITY OF SPILLWAY SECTION OF THE DAM. THE RAILROAD EMBANKMENT RUNS ALMOST PARALLEL TO THE REMAINDER OF THE EMBANKMENT. DOWNSTREAM FROM THE RR IS PACKERVILLE ROAD WITH A STONE ARCH CULVERT. AT SECTION AA WHICH IS IMMEDIATELY ABOVE THE CULVERT, THE FLOOD DEPTH IS ESTIMATED TO BE 10.3FT WITH A FAIRLY HIGH VELOCITY OF 7 FPS; THE ROAD IS NOT EXPECTED TO BE OVERTOPPED. HOWEVER, THE LARGE AMOUNT OF FLOOD VOLUME WITH A FAIRLY HIGH VELOCITY COULD DAMAGE THE CULVERT.

AT SECTION BB TAKEN ADJACENT TO A RESIDENCE, THE FLOOD DEPTH IS ESTIMATED TO BE 10FT. WITH A FAIRLY HIGH VELOCITY OF 9.5 FPS. TWO HOUSES LOCATED ON THE LEFT BANK ON PACKER ROAD ARE 9± FT. ABOVE THE STREAM AND THUS ARE EXPECTED TO BE FLOODED BY 1± FT. OF WATER. ADJACENT TO THE SECOND RESIDENCE, IT APPEARS THE STREAM IS SOMEWHAT OBSTRUCTED BY A FALLEN CONCRETE WALL. THIS OBSTRUCTION COULD FURTHER INCREASE THE FLOOD DEPTH IN THE VICINITY OF THESE TWO RESIDENCES. LOSS OF A FEW LIVES IS CONSIDERED LIKELY. THUS, IT CAN BE SEEN FROM THE ABOVE DISCUSSION THAT A HAZARD POTENTIAL OF SIGNIFICANT MAGNITUDE IS CONSIDERED LIKELY.

SUMMARY- HYDRAULIC/HYDROLOGIC COMPUTATIONS

PERFORMANCE AT PEAK FLOOD CONDITIONS:

PEAK INFLOW (TEST FLOOD 100 YR)	6,800 CFS
PEAK OUTFLOW	5,970 CFS
SPILLWAY CAPACITY TO TOP OF DAM (146.4 NGVD)	1,700 CFS
SPILLWAY CAPACITY TO TOP OF DAM % OF PEAK OUTFLOW	28
SPILL.CAP. TO PEAK FLOOD ELVN. (148.35 NGVD)	2,970 CFS
SPILL.CAP. TO PEAK FLOOD ELVN.% OF PEAK OUTFLOW	50

PERFORMANCE:

MAX POOL ELVN.	148.35 NGVD
MAX. SURCHARGE HEIGHT ABOVE SPILL.CREST	6.35 FT
NON-OVERFLOW SECTION OF THE DAM OVERTOPPED	1.95 FT

DOWNSTREAM FAILURE CONDITIONS:

PEAK FAILURE OUTFLOW	8,500 CFS
FLOOD DEPTH IMMEDIATELY D/S FROM DAM	8 FT

CONDITIONS AT THE PRIMARY IMPACT AREA: SECTION BB (STREAM BED EL. 116)

ESTIMATED STAGE BEFORE FAILURE WITH 1,860 CFS (T.O.D)	121.5 NGVD
ESTIMATED STAGE AFTER FAILURE WITH 8,100 CFS	125.9 NGVD
ESTIMATED RAISE IN STAGE AFTER FAILURE ΔY_1	4.4 FT

PRELIMINARY GUIDANCE
FOR ESTIMATING
MAXIMUM PROBABLE DISCHARGES
IN
PHASE I DAM SAFETY
INVESTIGATIONS

New England Division
Corps of Engineers

March 1978

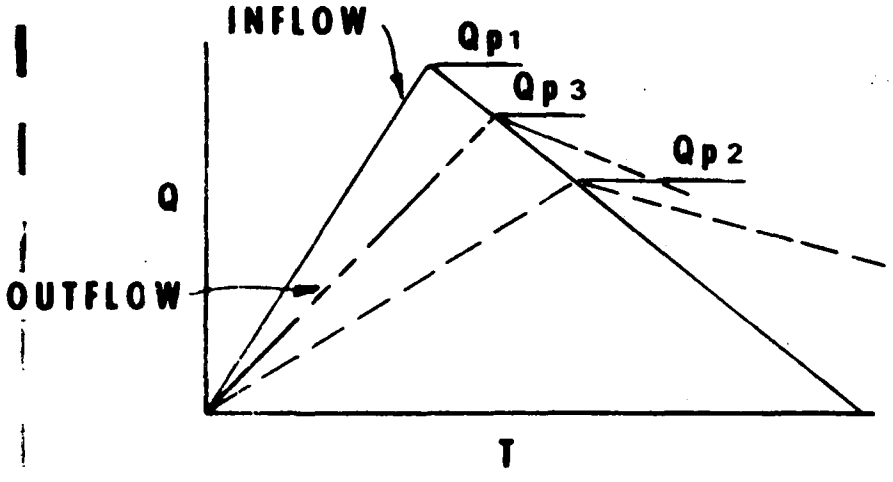
MAXIMJM PROBABLE FLOOD INFLOWS
NED RESERVOIRS

	Project	Q (cfs)	D.A. (sq. mi.)	MPF cfs/sq. mi.
1.	Hall Meadow Brook	26,600	17.2	1,546
2.	East Branch	15,500	9.25	1,675
3.	Thomaston	158,000	97.2	1,625
4.	Northfield Brook	9,000	5.7	1,580
5.	Black Rock	35,000	20.4	1,715
6.	Hancock Brook	20,700	12.0	1,725
7.	Hop Brook	26,400	16.4	1,610
8.	Tully	47,000	50.0	940
9.	Barre Falls	61,000	55.0	1,109
10.	Conant Brook	11,900	7.8	1,525
11.	Knightville	160,000	162.0	987
12.	Littleville	98,000	52.3	1,870
13.	Colebrook River	165,000	118.0	1,400
14.	Mad River	30,000	18.2	1,650
15.	Sucker Brook	6,500	3.43	1,895
16.	Union Village	110,000	126.0	873
17.	North Hartland	199,000	220.0	904
18.	North Springfield	157,000	158.0	994
19.	Ball Mountain	190,000	172.0	1,105
20.	Townshend	228,000	106.0(278 total)	820
21.	Surry Mountain	63,000	100.0	630
22.	Otter Brook	45,000	47.0	957
23.	Birch Hill	88,500	175.0	505
24.	East Brimfield	73,900	67.5	1,095
25.	Westville	38,400	99.5(32 net)	1,200
26.	West Thompson	85,000	173.5(74 net)	1,150
27.	Hodges Village	35,600	31.1	1,145
28.	Buffumville	36,500	26.5	1,377
29.	Mansfield Hollow	125,000	159.0	786
30.	West Hill	26,000	28.0	928
31.	Franklin Falls	210,000	1000.0	210
32.	Blackwater	66,500	128.0	520
33.	Hopkinton	135,000	426.0	316
34.	Everett	68,000	64.0	1,062
35.	MacDowell	36,300	44.0	825

MAXIMUM PROBABLE FLOWS BASED ON TWICE THE STANDARD PROJECT FLOOD (Flat and Coastal Areas)

	River	SPF (cfs)	D.A. (sq. mi.)	MPF (cfs/sq. mi.)
1.	Pawtuxet River	19,000	200	190
2.	Mill River (R.I.)	8,500	34	500
3.	Peters River (R.I.)	3,200	13	490
4.	Kettle Brook	8,000	30	530
5.	Sudbury River.	11,700	86	270
6.	Indian Brook (Hopk.)	1,000	5.9	340
7.	Charles River.	6,000	184	65
8.	Blackstone River.	43,000	416	200
9.	Quinebaug River	55,000	331	330

ESTIMATING EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES



STEP 1: Determine Peak Inflow (Qp_1) from Guide Curves.

STEP 2: a. Determine Surcharge Height To Pass "Qp_1".

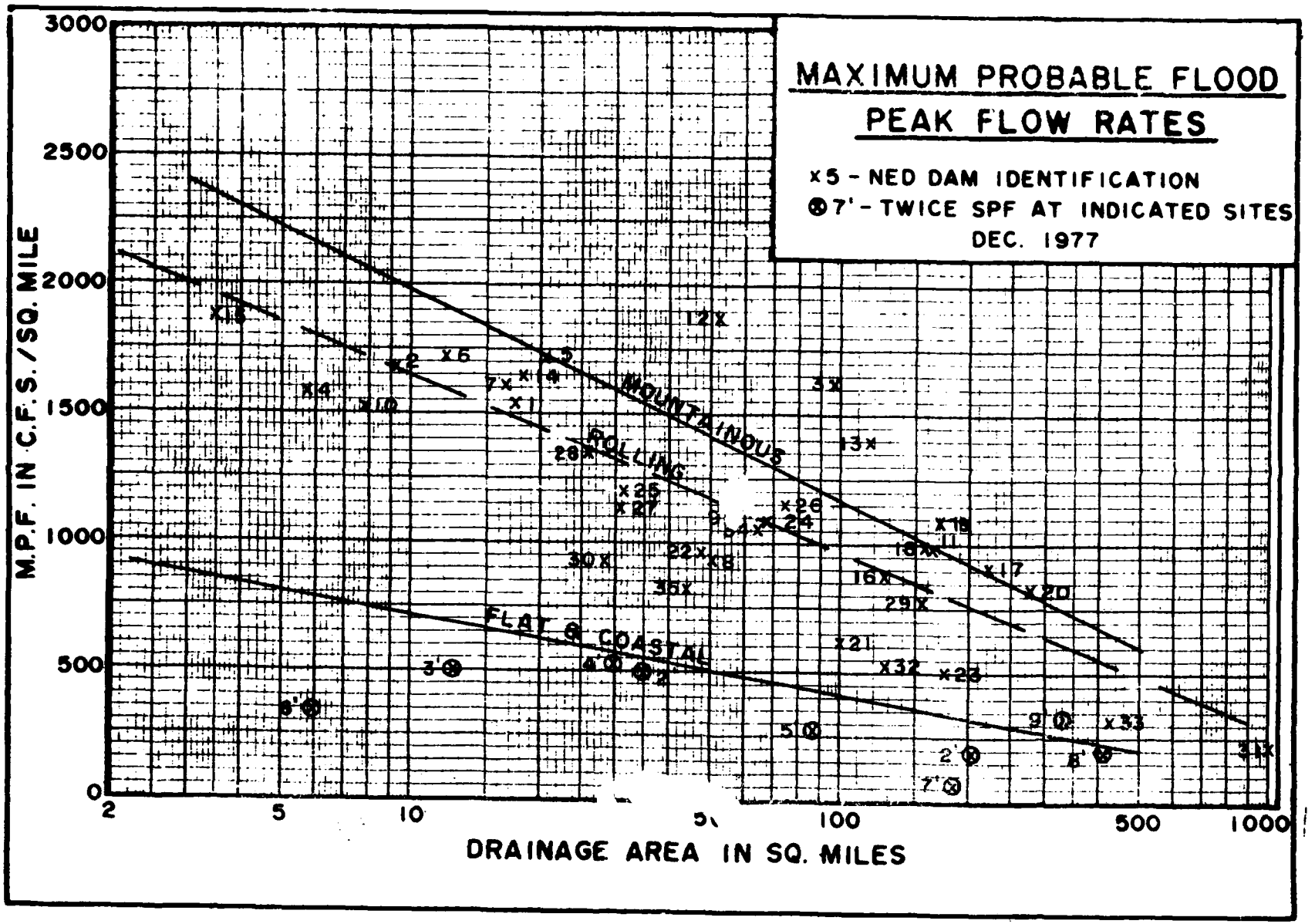
b. Determine Volume of Surcharge ($STOR_1$) In Inches of Runoff.

c. Maximum Probable Flood Runoff In New England equals Approx. 19", Therefore:

$$Qp_2 = Qp_1 \times \left(1 - \frac{STOR_1}{19}\right)$$

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Qp_2"

b. Average "$STOR_1$" and "$STOR_2$" and Determine Average Surcharge and Resulting Peak Outflow "Qp_3".


MAXIMUM PROBABLE FLOOD
PEAK FLOW RATES
x5 - NED DAM IDENTIFICATION
⊗7' - TWICE SPF AT INDICATED SITES
DEC. 1977
M.P.F. IN C.F.S./SQ. MILE
DRAINAGE AREA IN SQ. MILES
3000
2500
2000
1500
1000
500
0
2
5
10
50
100
500
1000
MOUNTAINOUS
ROLLING
FLAT & COASTAL

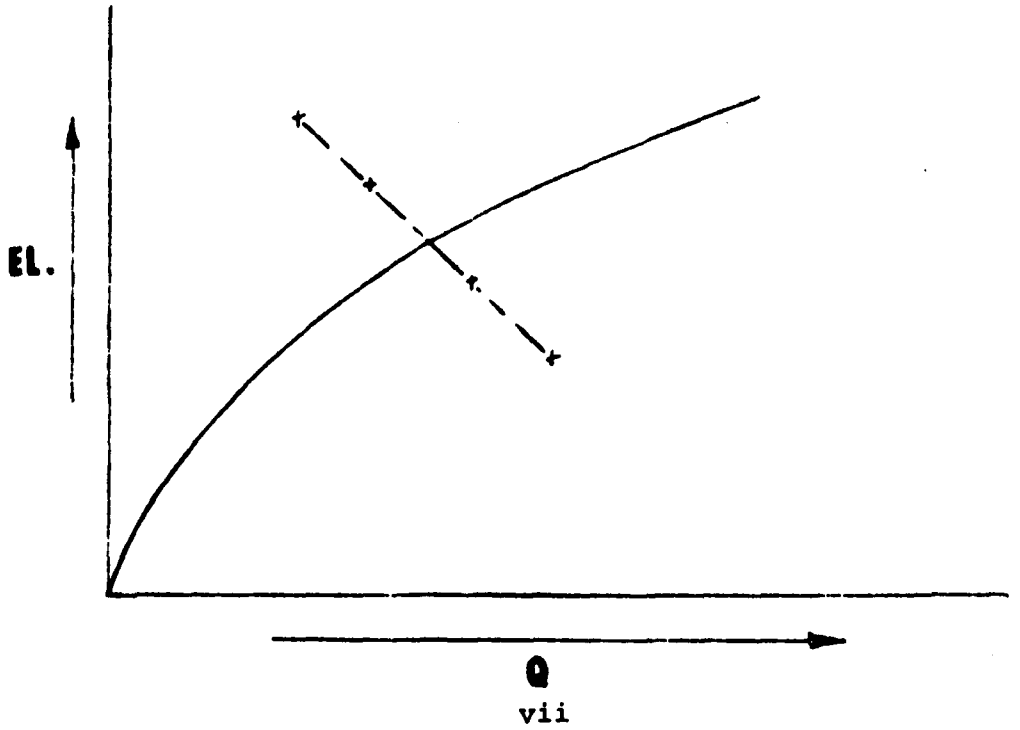
SURCHARGE STORAGE ROUTING ALTERNATE

$$Q_{p2} = Q_{p1} \times \left(1 - \frac{STOR}{19}\right)$$

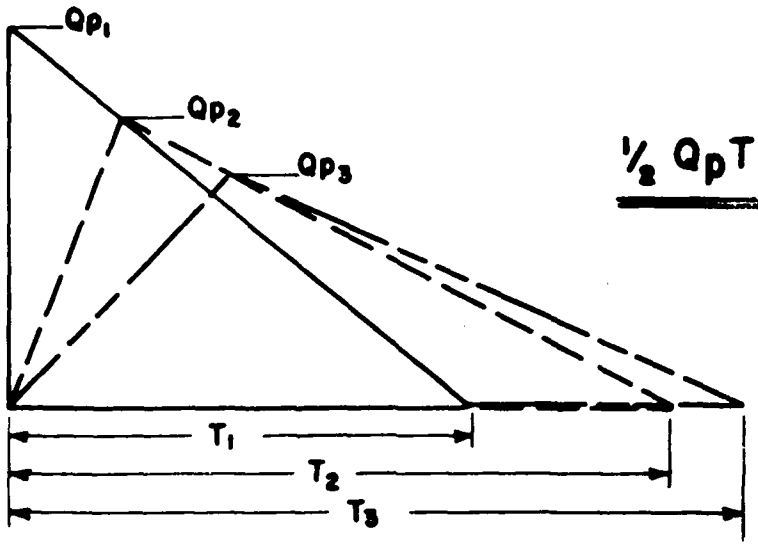
$$Q_{p2} = Q_{p1} - Q_{p1}\left(\frac{STOR}{19}\right)$$

FOR KNOWN Q_{p1} AND 19" R.O.

Q_{p2} STOR EL.



"RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS



$\frac{1}{2} Q_p T = 12 S$

STEP 1: DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.

STEP 2: DETERMINE PEAK FAILURE OUTFLOW (Q_{p1}).

$$Qp_1 = \frac{8}{27} W_b \sqrt{g} Y_o^{\frac{3}{2}}$$

W_b = BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

Y_o = TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

STEP 3: USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

STEP 4: ESTIMATE REACH OUTFLOW (Q_{p2}) USING FOLLOWING ITERATION.

A. APPLY Q_{p1} TO STAGE RATING, DETERMINE STAGE AND ACCOPMANYING VOLUME (V_1) IN REACH IN AC-FT. (NOTE: IF V_1 EXCEEDS 1/2 OF S, SELECT SHORTER REACH.)

B. DETERMINE TRIAL Q_{p2}.

$$Qp_2(TRIAL) = Qp_1 (1 - \frac{V_1}{S})$$

C. COMPUTE V_2 USING Q_{p2} (TRIAL).

D. AVERAGE V_1 AND V_2 AND COMPUTE Q_{p2}.

$$Qp_2 = Qp_1 (1 - \frac{V_{ave}}{S})$$

STEP 5: FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978

SURCHARGE STORAGE ROUTING SUPPLEMENT

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Qp_2"

b. Avg "$STOR_1$" and "$STOR_2$" and Compute "Qp_3".

c. If Surcharge Height for Qp_3 and "$STOR_{AVG}$" agree O.K. If Not:

STEP 4: a. Determine Surcharge Height and "$STOR_3$" To Pass "Qp_3"

b. Avg. "Old $STOR_{AVG}$" and "$STOR_3$" and Compute "Qp_4"

c. Surcharge Height for Qp_4 and "New $STOR_{Avg}$" should Agree closely

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

NOT AVAILABLE AT THIS TIME


FILMED
9 8